



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>



32101 064794223

6
5

Library of



Princeton University.



THE
BOY'S TREASURY
OF
SPORTS,
PASTIMES, AND RECREATIONS.

~~~~~  
WITH NEARLY FOUR HUNDRED ENGRAVINGS.

DESIGNED BY WILLIAMS,  
AND  
ENGRAVED BY GILBERT.

Third American Edition.

BOSTON:  
JOHN P. HILL.  
1848.



Gift.



THIS illustrated Manual of "Sports, Pastimes, and Reereations," has been prepared with especial regard to the Health, Exercise, and Rational Enjoyment of the young readers to whom it is addressed.

Every variety of commendable Recreation will be found in the following pages. First, you have the little Toys of the Nursery; the TOPS and MARBLES of the Play-ground; and the BALLS of the Play-room, or the smooth Lawn.

Then, you have a number of Pastimes that serve to gladden the fireside; to light up many faces right joyfully, and make the parlour re-echo with mirth.

Next, come the Exercising Sports of the Field, the Green, and the Play-ground; followed by the noble and truly English game of CRICKET.

GYMNASTICS are next admitted; then, the delightful recreation of SWIMMING; and the healthful sport of SKATING.

ARCHERY, once the pride of England, is then detailed; and very properly followed by Instructions in the graceful accomplishment of FENCING, and the manly and enlivening exercise of RIDING.

ANGLING, the pastime of childhood, boyhood, manhood, and old age, is next described; and by attention to the instructions here laid down, the lad with a stick and a string may soon become an expert Angler.

Keeping Animals is a favourite pursuit of boyhood. Accordingly, we have described how to rear the RABBIT, the SQUIRREL, the DORMOUSE, the GUINEA PIG, the PIGEON, and the SILKWORM. A long chapter is adapted to the rearing of SOME BIRDS; the several varieties of which, and their respective cages, are next described. And, here we may hint, that kindness to Animals invariably denotes an excellent disposition; for, to pet a little

1\*

(RECAP)

(5)



creature one hour, and to treat it harshly the next, marks a capricious if not a cruel temper. Humanity is a jewel, which every boy should be proud to wear in his breast.

We now approach the more sedate amusements—as **DRAUGHTS** and **CHES**; two of the noblest exercises of the ingenuity of the human mind. **DOMINOES** and **BAGATELLE** follow. With a knowledge of these four games, who would pass a dull hour in the dreariest day of winter; or who would sit idly by the fire?

Amusements in **ARITHMETIC**, harmless **LEGERDEMAIN**, or sleight-of-hand, and **TRICKS WITH CARDS**, will delight many a family circle, when the business of the day is over, and the book is laid aside.

Although the present volume is a book of amusements, Science has not been excluded from its pages. And why should it be? when Science is as entertaining as a fairy tale. The changes we read of in little nursery-books are not more amusing than the changes in **CHEMISTRY**, **OPTICS**, **ELECTRICITY**, **MAGNETISM**, &c. By understanding these, you may almost become a little Magician.

**TOY BALLOONS** and **PAPER FIREWORKS**, (or Fireworks *without* Fire,) come next. Then follow Instructions for **MODELLING IN CARD-BOARD**; so that you may build for yourself a palace or a carriage, and, in short, make for yourself a little paper world.

**PUZZLES AND PARADOXES**, **ENIGMAS AND RIDDLES**, and Talking with the Fingers, next make up plenty of exercise for "Guess," and "Guess again." And as you have the "Keys" in your own hand, you may keep your friends in suspense, and make yourself as mysterious as the Sphynx.

A chapter of **MISCELLANIES**—useful and amusing secrets—winds up the volume.

The "**TREASURY**" contains upwards of four hundred Engravings; so that it is not only a collection of "secrets worth knowing," but it is a book of pictures, as full of prints as a Christmas pudding is of plums.

It may be as well to mention that the "**Treasury**" holds many new games that have never before been printed in a book of this kind. The old games have been described afresh. Thus it is, altogether, a new book.

And now we take leave, wishing you many hours, and days, and weeks of enjoyment over these pages; and we hope that you may be as happy as this book is brimful of amusement.



|                         | PAGE |
|-------------------------|------|
| TOYS .....              | 9    |
| TOPS.....               | 22   |
| BALLS.....              | 25   |
| MARBLE.....             | 35   |
| IN-DOOR SPORTS.....     | 41   |
| OUT-OF-DOOR SPORTS..... | 56   |
| CRICKET.....            | 73   |
| GYMNASTICS.....         | 85   |
| SWIMMING.....           | 98   |
| SKATING.....            | 116  |
| ARCHERY.....            | 123  |
| FENCING.....            | 134  |
| RIDING.....             | 151  |
| THE ANGLER.....         | 168  |
| RABBITS.....            | 201  |
| THE SQUIRREL.....       | 214  |
| THE DORMOUSE.....       | 218  |
| WHITE MICE.....         | 220  |
| THE GUINEA PIG.....     | 222  |
| PIGEONS.....            | 224  |

|                                                   | PAGE |
|---------------------------------------------------|------|
| SONG BIRDS.....                                   | 243  |
| BANTAM, OR DWARF FOWLS.....                       | 269  |
| SILKWORMS.....                                    | 271  |
| DRAUGHTS.....                                     | 275  |
| DOMINOES... ..                                    | 284  |
| CHESS.....                                        | 286  |
| BAGATTELLE.....                                   | 303  |
| AMUSEMENTS IN ARITHMETIC.....                     | 304  |
| LEGERDEMAIN.....                                  | 315  |
| TRICKS WITH CARDS.....                            | 333  |
| AMUSEMENTS IN CHEMISTRY.....                      | 343  |
| ————— CRYSTALLIZATION.....                        | 365  |
| ————— OPTICS.....                                 | 371  |
| ————— ELECTRICITY, GALVANISM, AND MAGNETISM... .. | 395  |
| TOY BALLOONS.....                                 | 405  |
| CHINESE, OR ARTIFICIAL FIREWORKS .....            | 409  |
| MODELLING IN CARD-BOARD.....                      | 413  |
| ————— CORK.....                                   | 430  |
| PUZZLES AND PARADOXES.....                        | 432  |
| THE DEAF AND DUMB ALPHABET.....                   | 440  |
| ENIGMAS, RIDDLES, ETC.....                        | 445  |
| MISCELLANIES.....                                 | 456  |

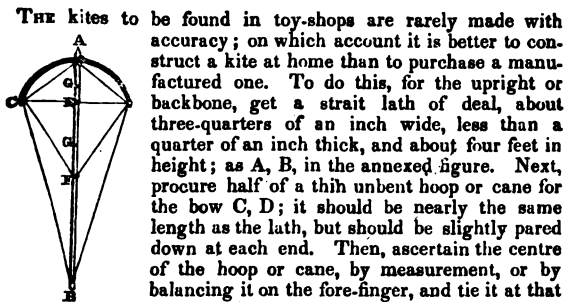


## TOYS.



FLYING THE KITE.

### THE KITE.



THE kites to be found in toy-shops are rarely made with accuracy ; on which account it is better to construct a kite at home than to purchase a manufactured one. To do this, for the upright or backbone, get a strait lath of deal, about three-quarters of an inch wide, less than a quarter of an inch thick, and about four feet in height ; as A, B, in the annexed figure. Next, procure half of a thin unbent hoop or cane for the bow C, D ; it should be nearly the same length as the lath, but should be slightly pared down at each end. Then, ascertain the centre of the hoop or cane, by measurement, or by balancing it on the fore-finger, and tie it at that point to the upright near the top A ; taking

care that it be fastened in the middle, else the kite will be lop-sided in flying. Cut a notch at the two ends of the hoop or

bow C, D; tie a long piece of string to D, pass it round the upright at E, and then fasten it at C; next carry the string to A, pass it down to D, and tie it there; from thence continue it to B, where it should be passed round a notch and carried up again to C, then down the upright to F, and up to D, where it is to be finally fastened off. The frame-work being thus completed, next paste several sheets of paper together to cover the frame; "fan-paper," or large, thin, and firm sheets should be selected; but thin glazed cotton is more durable. In joining paper, the sheets should overlap each other half an inch, and a solution of Indian rubber is preferable to common paste. The paper, being thus prepared, lay the skeleton upon it, and cut the paper to the form, leaving a margin of about an inch to turn over and paste on the frame-work, that over the bow being somewhat wider. Next, fix the belly-band by drilling two holes in the upright, at G G, through which pass the string, and knot it at each end, to keep it from slipping through the holes. Wings are not advantageous appendages, but if wished, they may be made of paper cut into slips, rolled up to resemble a tassel, and be tied to the sides of the kite at C, D. The tail should be from twelve to twenty times the length of the kite, according to the weight of the string and bobs, of which the tail is composed. Each of these bobs should consist of a piece of paper, about three inches and a quarter long, and an inch and a half broad, folded four times lengthwise. The bobs should be tied on the string at three inches apart, and the tail should terminate with a large tassel similar to one of the wings. Lastly, tie the string with which the kite is to be flown, in a loop to the belly-band: it should be made so that when the kite is held up by this loop, the two ends of the bow are balanced, and the lower extremity falls below the head of the kite. If this loop be not accurately placed, the kite will not ascend steadily; thus, when it plunges, the loop is too high; and when the kite twirls round in the air, the loop is too low.

When all the string has been let out, and the kite is at its greatest elevation, there may be sent up to it a *Messenger*, or a circular piece of paper with a hole in the centre, which being placed on the string, is carried by the wind to the kite. Sometimes, the messenger is made in the form of a dragon, and painted; and another variety, named "the Brompton Messenger," is thus described: "it consists of a hollow cylinder of stiff pasteboard or thin wood, the diameter of which is sufficiently large to allow its free revolution round the string of the kite. To this cylinder are attached several flappers or sails in an oblique direction, like those of a windmill, each of which is covered with paper of a different colour. The action of the wind upon their oblique surfaces necessarily occasions a rapid

rotation ; and the beautiful effect thus produced, as the whirling body ascends, must be seen before it can be appreciated.\*

Kites are sometimes made in the form of a bird, and occasionally to resemble the human figure ; but the common shape is, for several reasons, the best that can be adopted. The pastime of flying kites does not appear to have been known in England more than a hundred and fifty years. In China, however, it is of much more ancient date : there it is the favourite outdoor game, and one of the Chinese national holidays is specially devoted to kite-flying. The Chinese kites too are most curiously constructed ; and by means of round holes, supplied with vibrating cords, their kites are made to produce a loud humming noise, like that of a top.

The illustrious Sir Isaac Newton, when a boy at Grantham, introduced into the Grammar-school there the flying of paper kites, and took great pains to ascertain their best forms and proportions, and the point at which the string should be attached to them. He made also paper lanterns for candles, by the light of which he went to school in the winter mornings ; and he frequently attached these lanterns to the tails of kites in a dark night, so as to lead credulous people to believe his candles to be comets. The power of a flying kite is very considerable : it has been made to sustain a body in water, and even to draw a carriage upon common roads.

#### BATTLEDORE AND SHUTTLECOCK.

THIS game consists in two players, each having a battledore, striking a shuttlecock from one to the other. These toys can be purchased at any toy-shop ; but it is often requisite to turn the feathers of a new shuttlecock before it will spin, and uniformly present its cork end to the battledore. This game affords healthy muscular exercise ; it can be traced as far back as the fourteenth century, and it was fashionable for grown persons to play at it in the reign of James I. The Chinese have a game at shuttlecock, in which they use their feet as battledores.

#### THE APPLE MILL.

THE APPLE MILL is made by boring a hole in a nut, just large enough to pass a thin skewer through ; the kernel should then be extracted, and another hole bored in one side of the nut, as A in the annexed figure. A skewer should next be cut or thinned,

---

\* Philosophy in Sport made Science in Earnest ; in which clever and amusing work an entire chapter is appropriated to the construction and flight of the kite.

leaving it large enough at the top, to form a head, as shown in the cut. A piece of string is then to be tied to the skewer, then passed through the hole at the side of the nut at A, and an apple stuck on the end of the skewer. The mill being now complete in all its works, it should be twirled round in the same manner as the humming-top to wind up the string, holding the nut stationary between the forefinger and thumb of the left hand; when this is done, the string must be pulled out quickly, and the mill will immediately spin round. When an apple cannot be procured, a small potato will serve equally well.



#### THE SKIP-JACK, OR JUMP-JACK.

THE SKIP-JACK is manufactured out of the merrythought of a goose, which must, of course, be well cleaned before it is used. A strong doubled string or piece of catgut must be tied at the two ends of the bone, and a piece of wood about three inches long, put between the strings, as shown in the marginal illustration, and twisted round until the string acquires the force of a spring. A bit of shoemaker's wax should then be put in the hollow of the bone at the spot where the end of the piece of wood touches, and when the wood is pressed slightly on the wax, the jack is set; it adheres but for a very short time, and then springs forcibly up. The skip-jack may be placed either on the ground, or on a table; and, in some parts of the country, it is usual to call out, just before it springs, "Up, Jack!" or, "Jump, Jack!"




The Spring Cat differs but in form from the preceding toy. It is a wooden figure of a cat, the tail of which is tied at one end to a cross piece of catgut, is bent beneath the body, and has the other end pressed upon a piece of wax: it is thus set, and made to spring up like the skip-jack.

#### CAT AND MOUSE.

THIS sport, which is of French origin, is for two players only. Each should be blindfolded, and then tied to either end of a long string, to be secured by a loose knot in the middle to a post, so that the players are enabled to move about with facility. He who takes the part of the "mouse," scrapes two pieces of wood (one notched) together, so as to make a grating noise, which attracts the other player, or the "cat;" and he immediately strives to catch his prey, by following the noise; the "mouse," at the same time, struggling to escape being caught.

## TIP CAT.

 THE game of CAT, or, as it is generally called "TIP CAT," takes name from its being played with a piece of wood called the cat, shaped like a double cone, (as represented in the margin,) about six inches long, and two in diameter at the middle, and supplying the places of the trap and ball. To play the game, a large ring should be marked out on the ground, and a player take his place in the centre, and put the cat on the ground; he must then "tip the cat," i. e. tap one end of it with a stick, and as it rises with a rotatory motion, try to strike it over the ring; if he succeed, he guesses at the probable number of lengths of his cudgel the cat has fallen from where he stands; if, on measurement, by the stick, it is found to exceed the number guessed, he is out; if, on the contrary, it is within, he scores one towards his game. Another game is played in the following manner: six or eight holes are made in the ground, at equal distances, in the form of a circle; at each hole, a player stations himself with a cudgel, and one of the opposite party, (who stand out in the field, as in feeder,) throws the cat to the batsman nearest to him; and when the cat is struck, the players must change places, by running from one hole to another in succession. Should the cat be driven to a distance, the players continue running until it is stopped by the out-players: if the cat, after it is picked up, be thrown between any two of the holes before the player running from one can reach the other, he is out; but, if he do the latter before the cat is thrown up, he claims one towards the game.

## THE PEA-SHOOTER

is a tin or copper tube, about seven inches in length, through which a pea may be blown or shot from the mouth by the impetus of the breath, with considerable velocity, and to some distance. A pleasing experiment to show the power of air to support bodies in it, may be shown by holding a pea, or a pith-ball, at about half an inch from the orifice of a pea-shooter, placing the other end in the mouth, and blowing upwards, when the pea or ball will immediately rise in the air, and float there for several seconds, when it may be caught upon the tube, and again blown upwards. The stem of a tobacco-pipe, or a quill, will answer the purpose of the metal tube.

## JACK-STRAWS, OR JERK-STRAWS.

THIS game may be played with straws, but thin slips of deal are less liable to break. Forty or fifty of these slips are required



of three inches, and three or four of six inches, in length; they should all be rounded at one end, and pointed at the other; some of them are styled King, Queen, Bishop, &c., and should be distinguished from the others by dipping both ends in red paint for the King, and one end for the Queen; the Bishop may be painted black: the variations may also be made by putting little touches of wax on the slips instead of colours; these distinguished straws have different values assigned to them, as for instance, four for the King, three for the Queen, and two for the Bishop. One player should take up all the jack-straws in a bundle, and holding them at a little height from the table, let them fall in a confused heap on it; each player must then try alternately to take away a jack-straw from the heap without moving any of the others, and this it is generally very easy to accomplish at the first, for the top straws are mostly unconnected with the rest; but, as the players proceed, it requires some tact to jerk them out, with the help of a "pointer" or piece of wood made pointed for the purpose. The player, who at the entire removal of the heap, has the greatest number of straws, wins the game. Should any of the straws, while being removed, shake the others, they must be put back into the heap again. It is usual, in some places, instead of each player removing a straw alternately, for him to continue lifting up the straws until he happens to shake one; then another player takes his turn, until he in like manner fails, when the next tries his fortune; and so the game continues, until all the straws are withdrawn.

#### SPILLIKINS.

SPILLIKINS closely resemble the game jerk-straws, and the rules for playing it are precisely the same. The spillikins are made of thin pieces of ivory cut into different forms, some being like spears, others saws, bearded hooks, &c.: of certain of the patterns there are two, whilst of others only one. Each pattern has a value assigned to it, the lowest being five, and the highest forty; the numbers do not run in regular succession, such as five, six, &c., but irregularly, as five, sixteen, twenty-five, &c. Hooks, made of bone, are employed instead of pointers, to lift the pieces from each other.

#### THE HOOP.

TRUNDLING the hoop is mentioned by Horace as one of the manly sports of his time. With the shape of a hoop every boy is acquainted; it should be struck with the centre of the stick, else its progress will be comparatively small. Some few years since, little pieces of tin were fastened in pairs at intervals on the inner side of the hoop, so as to jingle as it was trundled.

Of late, cylindrical iron hoops have been generally substituted for those of wood, at least in and near London: and, instead of being trundled with a stick, these iron hoops are guided by an iron hook, shaped like the annexed figure; these hooks are sometimes fastened into wooden handles. Iron hoops should be trundled carefully, lest in falling they bruise the legs of the driver. The games played with wooden hoops are now almost obsolete: of these, perhaps, the best was called "Encounters;" it consisted in two players driving their hoops one against the other, until either fell, the player to whom the unsuccessful hoop belonged, losing the game.

If a hoop be projected forward with a spinning jerk, it will proceed to a certain distance, then stop, and run back to the hand.

#### POP-GUNS.

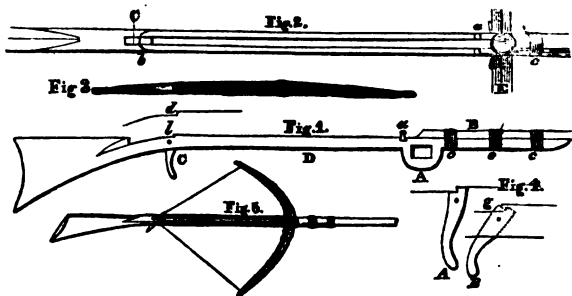
Pop-guns are made out of pieces of elder, about six inches in length; the pith is first extracted, and then the inside made smooth. The rammer should slide very easily into the bore of the gun, and have a shoulder or knob to the top, to prevent its slipping entirely through the barrel, and so push out both the pellets at once. The pellets should be made of moistened brown paper or tow: one of them must be placed in the mouth of the gun, and be driven to the other end by means of the rammer; the other pellet should then be put into the barrel at the mouth, and also be quickly driven to the other end, when the sudden compression of air within the tube will instantly drive the first pellet out with a sharp report, and considerable force. To add to the noise and the force, blow into the gun after driving in the first pellet, and take care to stop the bore up directly with the second pellet. A small pop-gun may be made out of a quill and wooden rammer, the pellets being cut by the barrel out of slices of raw potato.

#### THE WHALEBONE CROSS-BOW.

THIS toy is well calculated to display the skill of the juvenile artisan, as the elegance of the form, and fittings-up of the stock and barrel, depend wholly on the taste and ability employed in making them. In fig. 1, is shown the stock, in shape like a gun-stock; this should be cut out of a piece of mahogany, about eleven inches in length, two in depth, and half an inch in thickness.

From under the straight part D, which may be half an inch in depth, a piece must be left projecting, with a square hole cut through it, as shown at A; a groove should next be cut along this straight part D, and at a, two small pegs of box, or other

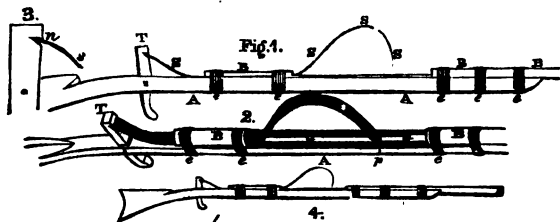
very hard wood, must be inserted. These pegs will keep the bowstring from fraying out, through chafing on the brass tube or



barrel B; this tube can be purchased at the brazier's, and should be about four inches in length, and of a diameter just sufficient to slide into the groove, and into which it must be very firmly fastened either by fine brass wire, or twine, well waxed, as at c, c, c, so that about one half of it projects beyond the stock, as shown in fig. 5. At C, an oblong aperture must be chiselled down the stock, for the action of the trigger, which should move on a pin for a pivot; at this part of the stock, a catch should be made, so as to nick off half the upper part of the trigger also, as shown at b; this will be better understood by referring to the little diagram d immediately above it, and also to fig. 2, which, in representing the upper surface of the stock, shows the top of the trigger C, and the way in which it is "nicked" or cut out, together with the manner of rounding off the corners at b, to prevent them from cutting the string when it is drawn back over the catch, as represented in fig. 5; E is the whalebone bow wedged into the square hole at A. Fig. 3 shows the bow made of two pieces of whalebone, the under one rather shorter and stouter than the upper; these should be joined together either with twine or brass wire. Fig. 4 represents the trigger in two points of view: when the bow is bent, and the string carried over the catch, as in fig. 5, the trigger remains as at A; but when the finger touches and pulls back the trigger, it appears as at B; the string is lifted up over the catch, by the lower end g of the trigger rising when touched, and the string instantly flies forward and propels with great velocity the shot or arrow placed in the groove. Fig. 5 shows the bow complete, with the string carried over the nick, preparatory to shooting.

THE WATCH-SPRING GUN.

Cut out the stock A, A, of the gun as before directed for that of the whalebone cross-bow, (omitting the piece on the under part of the stock,) and make a groove along it for the brass tube



or barrel B, B, to be fastened into; this tube is to be tied on to the stock at a little distance from the trigger, as shown in figs. 1 and 2, either by waxed twine or brass wire, as at e, e, e, e; a piece about two inches in length is to be cut out of this barrel as low as the stock, so as to form the hollow G, G, fig. 2, for the watch-spring to play in; by this contrivance, the spring acting in a metal groove, will move with greater facility than it could possibly do if it played in a groove of wood. The trigger T, figs. 1 and 2, should have a nick or catch made in it, as shown in the engraving; in this nick, the end of the watch-spring S, S, is to be placed; and the spring, after passing through the short part of the tube B, must be curved up and then bent down again into the groove G, G, as shown in figs 1 and 4; a pin p, fig. 2, must be driven through the barrel, and the head of it allowed to project up, so as to act as a catch, to which bend the spring. When setting the gun, the spring should be bent so as to catch against the pin's head, and whilst it is retained there, the shot must be put in the groove G, G; now, when the finger pulls back the lower part of the trigger, the upper part of it will press forward, and, of course, throw the spring forward also, and cause the latter to disengage itself from the pin's head, and to propel the shot through the barrel with considerable force. Fig. 3 shows enlarged the nick n, in the trigger; s is the end of the watch-spring inserted in the nick. Fig. 4 represents the toy complete; and it is to be borne in mind that the barrel B ought to project beyond the stock quite as much as shown in this figure.

2\*

B

## THE SLING.

THE sling is made by cutting a thong of leather, about two inches broad at the middle, and tapering at both ends, and fastening a piece of cord at each end, allowing one of the cords to be somewhat longer than the other. The proper method of using a sling, is to lay a stone in the middle of the leather, twist the longest cord two or three times round your hand, and hold the short one loosely between the thumb and forefinger; after whirling it round five or six times with great swiftness, let the short cord go, and in an instant the stone will be ejected with great violence to a considerable distance.

If a small vessel be filled with water and placed in a sling, it may be whirled round without spilling a single drop of the water, although the vessel will, at one moment, be inverted.

The art of slinging, or casting of stones with a sling, is of high antiquity, and probably preceded that of archery. The sling was much used by the Saxon and Norman armies, whence it has been adopted as a popular pastime.

## QUOITS.

THROWING up heavy weights and stones with the hand was much practised in former times. The Greeks, according to Homer, at the time of the siege of Troy, amused themselves with darting the discus, which was a large round flat plate of metal, very heavy. The discus has been called in English quoit, but improperly. Quoits is a game of skill, whereas the discus was only a trial of strength.

Yet the quoit seems to have originated in the ancient discus; and is in the present day, a circular plate of iron, perforated in the middle, and of size to suit the poise of the player. The discus was but rarely perforated.

To play the game of quoits, an iron pin, called a hob, is driven into the ground, within a few inches of the top; and, at twenty yards distance, more or less, for the distance is optional, a second pin of iron is similarly driven. The players are two or more persons, who are divided into equal parties or sides; one standing at one of the iron marks, and throwing an equal number of quoits to the other; and the nearest of them to the hob is reckoned towards the game. Thus, if a quoit belonging to A lie nearest to the hob, and a quoit belonging to B the second, A can claim but one towards the game, though all his other quoits lie nearer to the mark than all the other quoits of B; because one quoit of B being the second nearest to the hob, cuts out, as it is called, all behind it: if no such quoit had interfered, then A would have reckoned all his as one each.

Having cast all their quoits, the players walk to the opposite side, to ascertain the state of the game; there taking their stand, they throw their quoits back again, and so continue till the game is decided.

The most dexterous cast in the game is *ringing the quoit*, that is, throwing it so as to fall by the hole around the hob. Quoits is a favourite game at Westminster-school.

#### THE BOOMERANG.

THE BOOMERANG, or as it is most frequently spelt, the boom-



ERENG, is a toy made in imitation of a singular weapon employed by the aboriginal inhabitants of Australia. It is a piece of light wood two feet four inches in length, curved to the shape represented in the margin; one

side of it is perfectly flat and the other very slightly convex, indeed so slightly so, that its convexity is scarcely perceptible. When you use it, you must hold it in the right hand, horizontally, with the rounded side upwards; take aim, and throw it as if you intended to strike the ground some thirty yards off, and give it, on leaving the hand, a rapid rotary as well as progressive motion; when, instead of striking the ground, it will immediately rise upon the wind, to a great height, come round from left to right, and fall many yards behind you; or, if thrown with skill, it may be made to form two circles before coming to the ground. This toy must not be thrown *at*, but *toward* an object; for if it strike against the stout branch or trunk of a tree, it will immediately fall; and if thrown with a considerable degree of force, it will, most probably, be shattered to pieces. The Boomerangs used by the natives of the interior parts of Australia, are frequently ornamented with carvings. They have attained such skill in the use of this instrument, that they can hit objects at a great distance with it, and by this means they kill ducks on the rivers and lagoons. It is made of heavy wood, and is in the hands of a native of the Australias a dangerous and powerful weapon.

The rotary motion of the Boomerang may be tried on a small scale by cutting a piece of card the same shape as the prefixed wood-cut, and throwing it with a jerk of the finger from the back of a book.

#### THE SUCKER.

THE sucker is a toy of the simplest construction: it is made by merely cutting a circular piece out of tolerably thick leather, and then passing a string through a hole in its centre, and secur-

ing it by making a large knot at the end of the string, on the outer side. Before using the sucker, place it in water ; and when completely soaked, put it on a smooth stone and very closely set your foot on it ; then take hold of the string, and you may easily lift the stone from the ground.

#### THE BANDILOR

Is an ornamental toy, consisting of two circular pieces of wood, united to each other by a small axis, upon which a piece of string is fastened. To play with this toy, the string is wound round the axis, and is held by a loop at the end on the forefinger ; when the Bandilor descends from the hand, winds up the string again, and continues to do so at the pleasure of the holder, who should give the toy a slight spring or jerk, ere it reaches the extremity of the string. The sides of the Bandilor when ornamented with variously coloured figures, have a very pleasing effect ; especially when its rotary motion is moderately quick.

#### THE CUP AND BALL,

Or *Bilboquet*, of bone or ivory, consists of a stem, cup-like at one end, and spiked at the other ; to which is attached by a string a ball, with a hole at one extremity. To throw up the ball and catch it in the cup-like end, is an easy task ; but to throw up the ball so as that its hole may descend perpendicularly upon the spike which is held for its reception, you must make the ball spin upon an axis, at the extremity of which is the hole ; the truth of which theory will, however, be soon proved by practice.

#### BALANCE FIGURES.

Among the novelties which scientific investigation has added to our toys, are several figures, which will raise themselves upright whenever they may have been thrown down, and regain the erect position, notwithstanding their equilibrium is disturbed. The figures themselves are made of the pith of the elder-trees, or any other very light substance ; or they are moulded of a paper composition, hollow. Some figures are placed upon half a leaden bullet, and this heavy base being once set moving, the figure seems every instant about to fall, although if left alone it will soon "right" itself ; and, if the figure be pressed down, whenever the hand is removed it will regain its original position. Soldiers, and sitting personages in Eastern costume, (the latter loaded with lead at the base,) are the figures most frequently made, and the latter have a very droll appearance. Another figure is placed upon a ball loose in an elevated stand ; and from opposite parts of the ball project semicircularly two wires, at the end of each of which is a

smaller leaden ball ; by this contrivance the figure is kept upright, or made to resume its perpendicular position whenever it is disturbed. Another figure is a prancing horse, which being placed on the edge of a table by the hind legs, is prevented from falling by means of a bent wire attached to the belly of the horse, and reaching under the table, where it is terminated by a leaden ball.



To make one of the simplest of these toys, mould the figure of a man out of any very light substance, the pith of the elder-tree, for instance, which is soft, and can be easily cut into any form. Then provide an hemispherical base, of some heavy material, such as the half of a large leaden bullet, and take away all inequalities which may be on the convex part. Fasten the figure to the plane surface of the bullet, and in whatever

position it is placed, when left to itself, it will immediately rise upright.





## TOPS.



PEG IN THE RING.

### PEG-TOPS.

PEG-TOPS can be purchased at all toy-shops; those which have tolerably long pegs are the best for "peg in the ring," as they describe a much larger circle when spinning, and are afterwards more likely to swerve out of the ring than those with short pegs, which are generally "sleepers," i. e. apt to keep in one spot whilst spinning, so steadily that the top scarcely seems to move; the latter, however, are exceedingly well adapted for "chip-stone."

The peg-top is spun as follows:—Put the cord two or three times round the peg, and then wind it on the body of the top; place the button or small piece of stick at the end of the cord between the fourth and little finger, outside, hold the top within the hand, the peg towards the wrist, and throw it, over-handed, in a curved line to the ground, when a strong spin will be the result. The top may also be spun underhand, by throwing it straight forward, near the ground; but this is a less dexterous method than overhand, unless the player be active enough to spin the top so as to catch it in the palm of his hand. In case of the top not spinning, the failure is called "a mull."

In the game of PEG IN THE RING, it is the aim of each player to split the tops of his antagonists; and, if he succeed in doing so, he carries off the peg of the top he splits, as a token of triumph. A circle of about three feet in diameter should be drawn on the

ground; one player then begins the game by throwing or "pegging" his top into the middle of the ring, and whilst it continues spinning in there, the other players should "peg" their tops at it; if, however, it rolls out of the ring, the owner is at liberty to pick it up and peg at any of the tops still spinning inside the circle. Should any of the tops fall while in the ring, or any of the players be unable to spin their tops up, or not "peg" them fully into the ring, they are reckoned "dead," or "mulls;" and must be placed in the middle of the circle for the others to "peg" at: it often happens that several "dead" tops are thus in at one time, and that they are all driven out by one "peg," without either of them receiving injury; in this case, the players begin the game again. Tops made of box-wood are the hardest and best, but they are the most expensive. Pavement is not at all adapted for this game, as the force with which the tops are cast, is liable, on so hard a surface, to split them; smooth, firm ground, or gravel, is, therefore, the best suited for the peg-top.

#### CHIP-STONE

is usually played by two boys only, each of whom selects and uses a small roundish pebble, or "chip-stone," as it is termed; it should be the aim to procure the bright black stones, which are very even shaped, and beautifully polished. Two lines should be marked on the ground or pavement, at some distance apart, and the pebbles should be placed on one of them. The peg-tops are next to be spun, and whilst they continue spinning, the players must take them up in wooden spoons, (which can be purchased at the toy-shops,) and "chip" or cast them at the stones, so as to drive the latter from one of the bounds to the other. As the tops frequently keep on spinning, even after they have been cast at the stones, the players are allowed to take them up in their spoons, and "chip" again; indeed, a skilful player can "chip" three or four times before the top ceases spinning. The player who can send his chip-stone from one boundary-line to the other, in the fewest casts, is the winner. We have also seen this game played with a wooden ball, instead of the stone, when it is called "chip-top."

#### SPANISH PEG-TOPS.

THE Spanish peg-top is made of mahogany, and is shaped somewhat like a pear; instead of a sharp iron peg, it has a small rounded knob at the end. As it spins for a much longer time than the common English peg-top, and does not require to be thrown with any degree of force in order to set it up, it is extremely well adapted for playing on pavement or wooden floor.



## HUMMING-TOPS.

**HUMMING-TOPS** can be purchased at any toy-shop: they are spun in the following manner: after placing the fork on the upright, and putting a piece of string through the small hole in the latter, the top should be twirled round until nearly all the string is wound up on the upright; the fork should then be taken in the left hand, the string pulled out rapidly with the right, and the top will be instantly spun.

## WHIP-TOP

is a good game in cold weather, and may be played in or out of doors. To set the top up, twirl it quickly round with both hands, and begin to whip it immediately it acquires a tolerably strong rotary motion, being careful not to strike too hard at the first. A pliable eel-skin makes a far better whip for this sport than one made of leather; but it must not be kept either very dry or very wet, as in the former case it splits and cracks when used, and in the latter it becomes heavy and unwieldy with moisture. The games with whip-tops are:—Races, in which the boy who can whip his top to the greatest distance in the shortest time, is the winner; and Encounters, in which the players whip the tops against each other till one of them falls.

The whip-top was used in ancient times by the Grecian boys; and it was well known at Rome, in Virgil's time. It was played in England five centuries ago; and one of the games allowed at Harrow School, by the original regulations, in the year 1590, was "driving a top." The peg-top is a more modern invention.



## BALLS.



FEEDER.

### FEEDER.

In this game, four or five stones or marks must be placed on the ground, as in the annexed figure A, B, C, D, E, about twelve or fifteen yards asunder: these marks are called bases, and one of them, as A, is termed "home." The players next toss up for the office of "feeder," who takes his place about two yards in front of "home," as at F, and the rest of the players stand at and round the home. The feeder then calls out "play," and pitches the ball to the first player, who endeavours to strike it with a bat, as far as he can; should he hit the ball, he immediately drops the bat, and runs to the first base on his right hand, as E, while the feeder is going after the ball; but if he can run to all the bases and then home, before the ball is again in hand, so much the better. If, however, the feeder obtain the ball soon enough to throw it, and hit the other player with it, as he is running from base to base, he is *out*; he is also out if the feeder catches the ball: in either case, the player becomes feeder, and the latter runs home to join his play-mates. Should any of the other players be out at the bases, when one is caught or struck out, they also must run home. If the first player could only reach the base E, after striking the ball, he should, when the second player strikes it, run to the

base D; as two persons must not be at one base together; he proceeds in the same manner to the third and fourth bases until he arrives home again; thus enabling the others to get to the bases and home in their respective turns, unless they are either caught or struck out. No player is allowed to make more than three "offers" at the ball; if he does so, he is out and must be feeder.

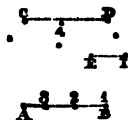
#### ROUNDERS.

This game differs from feeder only in the following particulars: the players divide into two equal parties, and toss up for innings, the winners taking their position at the home. The opposing party stations a feeder and also a player behind the home, to catch missed balls and "tips;" (when a ball is slightly touched by the corner or end of the bat, it flies off either to the side or behind the home, and is then termed a "tip"); this player's office is to endeavour when one of the in-party runs, after making a tip, to strike him out before he reaches the first base; whilst the rest of the out-party station themselves in the field, at various distances from the bases, to field, or throw up the ball, and catch out or strike out the players as they are running between the bases. In some places, it is usual when all the players but one have been caught or struck out, for him to take the rounders, i. e. strike the ball so far that he can run round to all the bases and then home before the opposite party can get the ball, and "ground" it, or throw it down on the "home." In taking the rounders, the player is allowed three balls; but when the ball is thrown to him the third time, he must run if he does not strike the ball five yards. If he succeeds in getting the rounders, his party resume their innings; if not, their opponents take their turn.

In other places, it is the custom when two or three are out, if one player can obtain the rounder three times, for the player who was struck out first, to come in again; and if any more players get the same number of rounders, for the others, who were out, to resume their places; and so, it often happens that the in-party thus regain all their lost partners. If two players happen to be at one base at the same time, the out-player who has picked up the ball, should stand about the length of a horse and cart, or as near that measure as he can guess, behind the base; one of the boys at the base, after making several feints in order to deceive him that has the ball, runs off to the next base, and as he does so, the other throws the ball at him; if the ball strike him, he is of course out; if not, he continues in the game. The rules respecting the number of offers, and catching and striking out, are precisely the same as in feeder. A smooth round stick is preferred by many boys to a bat for striking the ball.

## BALL STOCK.

BALL STOCK, or, as it is rendered in English, BALL STICK, is, as its name indicates, a German game. In the method of playing, it is very similar to rounders. The players are divided into two parties, as nearly equal in point of numbers and skill as possible. The bases are then marked out as in the annexed figure, the principal ones being at A, B, and C, D, with the intermediate one at F; the distance is, of course,



at the option of the players. They then toss up for innings, the in-party occupying the base or home A, B, and the out-party stationing themselves in various parts of the ground, as in Rounders or Cricket; reserving one boy as feeder, who should stand at 1, and another at 3, to toss back the rejected balls and "tips." The feeder should be an active player, and particularly clever in catching; the success of the party mainly depending on him. The feeder commences by tossing the ball gently towards the striker, who stands at 2, making it fall as near the end of the bat as possible, so as to allow good scope for the hitter's aim. Should the latter succeed in striking a good blow, he makes the best of his way to the base C, D, taking care to touch at the "resting base" E, F. On the contrary, should the ball be only tipped, or struck but a short distance, or stopped by one of the lookers-out, he should run to the resting-base and remain there till another of his party be more fortunate, and take his opportunity. It sometimes happens that half a dozen or more are detained at the resting-base at one time, all looking forward to a successful hit to relieve them; the runners must be cautious not to quit this base too hastily, for when they have once left, they cannot return, but must proceed; if struck with the ball, whilst running from one base to another, they are out, and must remain inactive spectators of the game till the rest are out too. In the same way, when at the lower base C, D, they must watch their opportunity to return to the home, where they again take their turns with the bat in rotation, in the order in which they arrive. Thus, the game continues till all of the in-party are either caught or struck out, or fail in hitting the ball; three offers being the number allowed, as in rounders. It is necessary that a good player be stationed at 4, such being, next to feeder, the most important post. Care should be taken to strike the ball as low as possible, to avoid giving "catchers." A looker-out should not throw at a boy running unless he be pretty sure of his mark; but should rather throw up the ball to the "feeder," or down to the one who stands at 4, as circumstances require, as they

cannot fail to intercept the boys' arrival at the base where they are stationed.

#### FOOT-BALL.

DURING the winter months,

" Kicking, with many a flying bound,  
The foot-ball o'er the frozen ground,"

is an admirable pastime. A match being made between two parties about equal in point of strength and numbers, two goals or boundaries should be marked out, or denoted by sticks driven into the ground, a hundred yards asunder. The game consists in one party striving to kick the ball beyond the goal of their opponents, who, at the same time, use their utmost endeavours to prevent this, by trying, in turn, to drive the ball beyond the bound of their adversaries. The game is commenced in the middle of the space between the two goals, and the party over whose goal the bladder is first kicked, loses. The best kind of ball is one made of a blown bladder covered with leather.

Foot-ball was once a popular old English game: it was prohibited by law in the reign of Edward III., lest it should impede the progress of archery. It was formerly a favourite Shrove Tuesday game in many towns of England; and it is still much played on the Scottish border.

#### STOOL-BALL.

A PLAYER stations himself in front of a stool, and another, standing at some distance off, pitches a ball so as to touch the stool, which it is the aim of the first player to prevent by striking the ball away with his hand, reckoning one towards the game every time that he succeeds; should he miss his mark, and the ball touch the stool, he must in his turn throw the ball, while the other player takes his place. The player who can hit the ball most times before it touches the stool, is the winner. In some country places, several stools are set up in a ring, at a distance from one another, and on each stool a player seats himself; the ball is then tossed to one of the sitters, and if he can hit it, they all run from stool to stool; but if the thrower can regain the ball soon enough to strike one of the players before he can reach a stool, the player so struck has to throw the ball, whilst the other takes his place in the circle; the game is then continued as before. The ball must be struck by the hand, and not with a bat.

## FIVES.

A WALL, having a good smooth piece of ground in front of it, should be chosen for this game; chalk a line along the wall about a yard from the ground; and on the ground, at the distance of two yards from the wall, draw a line as A, B, in the annexed diagram; then at the end, A, draw a line, as at C, D, and at B, another, as at E, F; these two lines being called bounds. The game is usually played by four boys; two on each side: innings being tossed up for, the stations are then taken as represented by the dots in the above figure; 1, 2, being partners, and 3, 4, partners also, opponents of 1, 2; the winners standing at 1, 2, number 3 begins the game by dropping the ball on the ground, and as it rebounds, he strikes it against the wall with his hand; when it falls to the ground again, number 1 endeavours to strike it up, and so on till one of the players either fails to strike the ball, or sends it beyond the bounds, or else below the mark on the wall. If one of the in-party make either of these faults, he loses his innings; and whenever one of the out-party fails, the in-party reckons one towards the game, which is eleven. When number 1 is out, number 4 has to toss the ball up for number 2; and when both numbers 1 and 2 are out, they have in their turn to send up the ball for numbers 3 and 4. The ball need not rebound every time beyond the ground line, that being merely to make the player give it fully out at first. The feet may be used to kick up the ball, when it is so low that it cannot be struck up with the hands. The above shows the manner of playing "double fives," i. e. with partners; but the rules are the same for the single-handed game. There are many methods of making fives balls, but the following is one of the easiest and best. Procure two small twopenny India-rubber bottles, and having cut each of them round and round with a stout pair of scissors, into one long thin strip, wind them up as near as possible into the shape of a ball, using a small piece of cork as a foundation; over this, wind some worsted, until none of the India-rubber is visible, making the shape as perfectly round as possible; this should then be covered with a piece of stout wash-leather, and the ball will be complete. Care should be taken not to wind it up too tightly, as it may hurt the hand, and will not rebound well.

Fives is supposed to have been named from the game having been played in Queen Elizabeth's reign, by five competitors on each side; or, from the ball being struck with the five fingers or palm of the hand. Fives is similar to Racket, except that in the latter the ball is struck with a bat of a frame and catgut, instead of the hand.



## HAND-BALL

is a healthy pastime, especially when it is played in the open air. The ball is made of a bladder, the rounder the better, which is oiled and fitted with a leathern case. It is then blown out, and when quite full of air, the opening is tightly tied with pack-thread. The leather case has a sort of valve that neatly covers the orifice. A caoutchouc or Indian rubber ball, to be bought at a toy-shop, is much superior to this bladder-ball, on account of its rebounding better.\* If the players be divided into two parties, they toss up to decide who shall begin with the ball: it is then thrown up, when each party strives to strike it with the hand to the adversary's goal, and the first that succeeds, wins. When the players are not in sides, they stand in a circle, and each strikes the ball as he best can.

Hand-ball was formerly an Easter game in England, and it is much played in France and Italy. It was anciently played with a glove; then cords were bound round the hands, to make the ball rebound more forcibly, and hence originated the Racket.

## EGG-HAT.

"To pitch the ball into the grounded hat," is a very favourite pastime. All the players place their hats or caps on the ground, close to a wall, in such a manner that a ball may be easily pitched into them. A line is then marked on the ground, about fifteen feet from the wall, at which a player takes his station, and begins the game by throwing the ball into one of the hats; all the boys run away, except the boy into whose hat the ball is thrown; he runs to take it out, and endeavours to hit one of the runaways, by throwing the ball at him; if he can do so, the party struck has, in his turn, to pitch the ball into the hats; if, however, he fail in hitting one of the boys as they are running away, he loses a point, and has to throw the ball into the hats again. Should one of the runners be hit, he may, if he can obtain the ball soon enough, throw it at another; and this may continue until one of the players miss, when he must, of course, pitch into the hats. Sometimes, one player takes the ball from another, and endeavours to hit one who may be near him; should he fail, he loses a point; and when a player loses three points, he is out. If a player fail three times in endeavouring to throw the ball into a hat, he loses a point, but continues throwing till he succeeds. When all the players but one have been struck out, he is considered the winner; and the punishment of the losers then commences: one of them stands near the

---

\* In Guiana, balls for children have long been made of caoutchouc; and so light are they as to rebound several times between the ceiling and floor of a room, when thrown with some force.

wall, and throws the ball at it with all his force; he next stands with his back, and extended right arm and hand, close to the wall; the winner, from the spot where the ball first fell, aims three times at the loser's hand, and each loser is thus punished in his turn. In some places, however, when one boy gets out, he throws the ball against the wall, as above; and from the spot where it first falls, each of the other players throws three times at the loser's back as he faces the wall. But, should the ball, in rebounding, swerve either to the right or left, a line must be drawn from the spot where it falls, to a place in a direct line from the boy at the wall.

In some parts of the country, this game is played with holes dug in the ground near a wall, one hole being allotted to each player, and numbered, and into which the ball is bowled instead of being pitched into the player's hat, as above.

#### MONDAY, TUESDAY.

This game is designated from the names assumed by the seven players, each after one of the days of the week. It is played as follows: suppose the ball to be taken by "Wednesday;" he throws it up against a wall and calls out, say "Friday!" who endeavours to catch the ball ere it falls to the ground, whilst the other players run away. If "Friday" succeed, he again throws up the ball, and calls out another boy's name, say "Sunday!" and should he not catch the ball before it grounds, he must pick it up, and throw it at the retreating party; and the boy whom he hits has to throw the ball up the next time: but, should he not strike one he loses a point, as in Egg-hat; indeed, the punishment of the losers and the number of points resemble the rules of that game.

#### CATCH-BALL.

is a slight variation from the two preceding games; the player being called to catch the ball by his real name instead of an assumed one.

#### GOLF.

GOLF or *Goff*, is supposed to be the most ancient game played with a ball and club or bat. Strutt tells us that "it resembles a rustic pastime of the Romans, which they played with a ball of leather stuffed with feathers; and the goff-ball is composed of the same materials to this day. In the reign of Edward III., the Latin name *cambuca* was applied to this pastime, and it derived the denomination from the *crooked* club or bat with which it was played. Hence, the club has been termed a "Bandy," and the game "Bandy-ball."

Golf is played upon a large piece of open ground, or common, sometimes two or three miles long; Blackheath, near Greenwich

for example, is a fine *green* for this sport, and here play "the Blackheath Golfing Club." The bat is a thin stick with a straight handle, generally about four feet and a half long, and is made of ash or hickory: its extremity is curved, and about five inches wide, one side being rounded and loaded with lead, and the other flattened and faced with horn. The ball is not more than an inch and three quarters in diameter: it is made of leather, and stuffed so hard that sometimes within this compass is compressed a hat full of feathers. There are generally two players, one matched against the other; and each has his own ball and bat; but when four persons play, there is only one ball, which is struck by turns. At irregular distances at the sides and ends of the green are dug holes, the number varying from five to nine teen, into which holes whoever drives the ball in the fewest strokes, wins the game. In commencing, the player may place the ball upon a little turf about three inches in height, from whence is made the first stroke, which is generally a very long one; but the ball must afterwards be struck from the spot where it happens to lie; and whichever ball lies farthest from the hole to which the players are proceeding, it must be always played till it gets before the other. When the ball, at length, gets near a hole, great skill is shown in striking it so gently as not to make it go beyond the hole, but, if possible, into it.

Golf is much played in Scotland, where there are several associations or clubs of golfers. Upon the links or course of St. Andrew's, a ball has been struck 220 yards; and to obtain the game, (nineteen holes,) within ninety strokes is considered to denote a master in golfing. The making of golfs and balls is here, too, a regular profession.



HOCKEY.

HOCKEY.

Two boundaries being marked out at some distance apart, two players, each having a stick with a curved or crooked head, take their places facing each other, as represented in the engraving. The aim of one player is to strike a ball—placed on the ground between them—over his own bounds, while the other endeavours to prevent this by driving the ball in the opposite direction over the other goal. The player who can strike the ball eleven times over his own boundary, wins the game.

*Shinty*, in Scotland, much resembles our Hockey, and is played with a little wooden ball or shinty, and hawthorn clubs. *Hurling*, in Ireland, played also with crooked bats and a ball, scarcely differs from Hockey.

TRAP, BAT, AND BALL.

THE shoe form of the trap is well known: it should be placed on the ground with the heel a little sunk; and two boundaries should be marked at about twenty-one yards distance from the trap, and the same apart. The players having tossed up for innings, those forming the outside, place themselves. The player on the inside then puts the ball into the spoon of the trap, touches the tongue of the trap with his bat, and as the ball rises he strikes at it smartly; but, if he miss it, or touch the tongue more than twice without hitting the ball, or do not hit it over the line and between the bounds, he is out: and the next player, in the order settled beforehand, takes his innings. When the ball is struck, and one of the out-players catches it before it falls to the ground, the striker is also out; but if the ball be not caught, the out-player who stops it must bowl it from the spot where he picked it up, towards the trap; if it touch the trap, the striker is out; but if not, he is scored one to the game, to be of any agreed number. Sometimes the striker guesses the probable number of bats' lengths within which the ball may be bowled up to the trap; when, should he guess under the number of lengths, he counts them towards his game; but if above the number, he loses his innings. The game may be played by any number; and strict players drive stakes for the bounds, and place upon them a line or tape two feet high, over which the ball must be sent, else the striker is out.

NORTHERN SPELL.

A TRAP is used in this game, and either a bat or a short stout stick, to strike the ball with; but the stick is the most usual. The game consists in striking the ball to the greatest distance in a given number of strokes. This is measured by a cord marked

into yards, and numbered, fastened near the trap, and carried out by one of the players to the spot where the ball lies; when the distance is called out to the players standing around the trap, who score it off towards their game, and then throw the ball back. It is a dull, uninteresting pastime, when compared with trap, bat, and ball.



## MARBLES.



"On yon gray stone, that fronts the chancel door,  
Worn smooth by busy feet now seen no more,  
Each eve we shot the marble through the ring,  
When the heart danced, and life was in its spring."

ROGERS.

MARBLES are of modern invention ; previous to which, nuts and round stones appear to have been used by boys as substitutes for bowls. It is said that the Emperor Augustus, when a youth, spent many hours in the day in playing with little Moorish boys "*cum mucibus*," with nuts, in the same way that lads now play with marbles.

There are various kinds of marbles : those made of agate are most prized ; next rank the allies of *marble*, pure white, veined and clouded with pink, or almost wholly of that colour ; and others are of very hard yellowish stone. These kinds are mostly manufactured by iron mills in Germany, and imported from Holland. The inferior sorts are made in England from clay, glazed and burnt in a furnace, and gaudily painted yellow and green ; whilst the "*commonneys*," of the lowest class, are of yellowish clay. The larger marbles, called *bosses*, or *bonces*, are of stone, or clay, and measure about four inches round. The *taw*, or marble shot with, is usually of hard stone, and is chosen for its beautiful spots, circles, veins, or other marks.

## RING-TAW

is one of the best games of marbles. To play it, draw a circle upon the ground, and let each person place upon it or within it a certain number of marbles: then draw at a short distance from the ring a line or offing, from which each player in turn is to shoot. If he strike a marble out of the ring, he will be not only entitled to it, but likewise to shoot again before either of the other players: and he may thus continue to shoot on until he miss, or clear all the marbles out of the ring: this should be a large one, else there may be little chance for any but the first player. Each player only fires from the offing at first, and afterwards shoots from the spot where his taw last rested: if he leave his taw in the ring, he is not only to be put out of the game, but must place a marble in the ring, together with any marbles that he may have previously shot out of it. And, should a player's taw rest outside of the ring, an opponent may shoot at it, and by hitting it, put him likewise out of the game, and be entitled to receive whatever marbles the beaten party may have already shot out of the ring. Besides these rules, there are certain conditions to be observed at ring-taw, at the call of the other players; as to "knuckle-down," by making the middle joint of the forefinger touch the ground in firing, and the hand remain there after the shot has been fired, so as to prevent the player unfairly pushing his marble towards the ring. But, in playing near a fence, should your taw roll so that you have not room to kneel behind it, you may shoot it from your knee or from your hip. The principal art of the game consists in not only shooting the marble out of the ring, but taking up a good position with your own taw for future operations.

## INCREASE POUND

in most respects resembles ring-taw, the variations being as follow: each player usually puts one marble only into the ring or pound, to begin the game; if, before a marble is shot out of the ring, one player's taw is struck by that of another, (except it be his partner's) or, if he shoot his taw into the ring, he must put a marble into it, for which he continues in the game, and shoots again from the offing before either of his companions. But if his taw be struck *after* one or more marbles have been shot out of the ring, and if he have taken any shots himself, then he must give them to the player who struck him, put a marble into the ring, and shoot from the offing, as before. If, however, after any shots have been struck out of the ring, he has not won any of them, and his taw be struck, he is "killed," and put out of the game; but, if his taw get within the ring,—if it remain on

the line, it is nothing,—he must put into it his won shots, if any, adding one to them, and then shoot again from the offing. If, however, he cannot get any shots after his taw gets “fat,” as remaining in the ring is termed, then he is “killed” out of the game; but his taw does not get “fat” by remaining in the ring when there is only one marble in it.

#### SNOPS AND SPANS.

ONE player having shot his marble a short distance, another tries to hit or “snop” it, or to shoot within a “span” of it; and, if he do either, he takes up the marble. Should he, however, miss it, or fail to reach within the span, the first player takes up his marble, and shoots at the taw of the second; and thus they continue to shoot until either one or the other is snopped or spanned. The winner then begins the game again.

#### THE PYRAMID, OR CASTLE,

is built with three marbles set triangularly, and one on the top of them; or with six first, then four, and next one; and a circle is then drawn round the pile. One player takes the post of keeper or guard, and another having given the latter a marble, he shoots at the pyramid from a short distance: should he hit it, with his taw, he is entitled to as many marbles as he thereby drives out of the ring. The keeper then rebuilds the pyramid, and the firing is renewed; the game being varied by each player, at agreed intervals, keeping the pyramid.

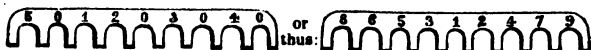
#### THREE HOLES.

MAKE three holes in the ground, about four feet apart from each other, either in a line, or at each point of a triangle; and draw a line or offing at six feet from the first hole. The first player begins, standing at the line, by attempting to shoot the marble into the first hole; if he succeed, he shoots again, at a span distance from the first hole, toward the second. But if he miss, the second player tries his fortune, each shooting by turns, as his opponent fails. A player may also, after shooting his marble into a hole, aim at his opponent's taw, should it be near, so as to drive it from the holes; and should he hit it, he may shoot into the holes as before. That player is the winner who first reaches the last hole in this manner; first hole, second hole, third hole—second, first,—second, third. The game is sometimes played for a stake of marbles; but, generally, the loser having placed his knuckles in the first hole, the winner shoots as near to it from the offing line as he can, and from the halting-place of his marble he fires three times at the said loser's knuckles.



## NINE-HOLES, OR ARCH-BOARD.

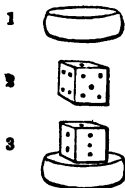
Cut out of a piece of wood a resemblance of a bridge, with nine small arches in it, and number them thus:



The bridge is kept by a boy, whilst another boy attempts to bowl or shoot a marble through the holes: if the marble hit the divisions of the arches, or touch their sides, it is forfeited to the bridge-keeper; on the contrary, if the marble pass clean through an arch, the keeper gives the number of marbles marked over it, to the bowler. This rule, however, applies only to the board marked 5, 0, 1, 2, 0, 3, 0, 4, 0; but for firing at the other board bearing higher numbers, the bowler pays the keeper a marble each time, in addition to the chances of losing his marble. In some parts of the country, iron bullets are substituted for marbles in the above game.

## DIE AND CHEESE.

GRIND down two opposite sides of a marble, so as to make it resemble a cheese (fig. 1.); then make a small cube, or die, out of another marble (fig. 2.), and mark on its faces numbers from one to six. Set the die upon the cheese, as represented in fig. 3.; for shooting at it from a short distance, a boy pays the owner a marble each time; and should he knock the die off the base, he is entitled to receive from the owner as many marbles as there are dots on the uppermost face of the die.



## BOST-ABOUT

is played like snops and spans, except that instead of shooting the marbles, they are to be bosted, pitched or bowled. *Bost-in-the ring* is played similarly to *ring-taw*, the large bosses being bowled instead of the small taws shot.

## LAG-OUT, OR KNOCK-OUT.

Any number may play at this game. It is commenced by throwing a marble against a wall, so that it does not rebound more than a yard from it; the next player also throws a marble against the wall, and attempts to make it rebound in such a direc-

tion as to hit the marble of the first player, or else to come within a span of it. If he succeed in either, he wins the marble, and begins again; but if he does not succeed, the first player takes up his own marble, and tries to hit or span that of his antagonist. If there be but two players at this game, each should "knock out" two or three marbles before either uses those which lie upon the ground, by which arrangement a boy may not only win his own marbles back, as when down they are reckoned common property, but he may also choose either of the marbles to play with. Sometimes this game is played with an unlimited number of marbles; each player leaving the several marbles he knocks out upon the ground, until he hits one, when he is entitled to take up all the marbles that are out.

#### BOUNCE-EYE.

THIS game requires several players, each of whom puts down a marble, so as to form a small ring: one player begins by holding a marble in his hand, close to his eye, and letting it fall upon the ring; and whatever marbles he thus forces out of the circle, he is entitled to. The other players then try their skill in turn; and all are termed "bouncers."

#### THE CONQUEROR.

IN this game, one boy places a marble upon a smooth spot, where it is either hard earth, or gravel; turf, through its being too soft, and pavement much too hard, are both unsuitable; another boy then throws his marble, with all his force, at that of the first player, endeavouring in this manner to split it; if he be unable to do so, the first player takes up, and in his turn, throws his marble at that of the second; and so on, alternately, each striving to split his antagonist's marble. Sound, strong, stone marbles are the best in this game; and when a marble has been victorious in many such games, it is only used against those which have, in like manner, proved themselves worthy of the honour of contending for the superiority. Suppose two boys to be playing at this game, and each of them to have been victors in many encounters with other opponents; if one of the taws break, the owner of it must hand over to the conqueror as many marbles as he may have won with his tau, and one also for the tau so broken; or, sometimes, he merely adds the number of the conquered: for example, should his tau have previously broken twenty marbles, and then split another tau which has split fifteen, the conqueror adds that to his own number, making thirty-five, besides one for the tau just split.

## PICKING THE PLUMS.

DRAW a line upon the ground, and let each player place upon it a certain number of marbles, to be bosted or shot off from a given distance; when each player is entitled to as many marbles as he *picks* off; each boy shooting but once in his turn.

## ODD OR EVEN

Is played by two boys, thus:—one conceals in his hand one or more marbles, and the other guesses “odd,” or “even;” the marbles are then shown and counted; if they correspond with the guess, the hider loses, and pays one marble; if the contrary, of course he wins.

## EGGS IN THE BUSH.

ONE boy grasps in his closed hands any number of marbles, which, should the other guess precisely, he wins them; but, if he guess incorrectly, he pays as many marbles as are under or over the number shown to be in the hand. It is fair to pack the hand so as to make it seem largest when it has the least number of “eggs” in it, and small when there are most eggs; and sometimes the guesser is allowed to feel the packed hand, to assist him in guessing the number of marbles in it. In this game, as well as in “odd or even,” the players should hold and guess by turns.



SHADOW BUFF.

#### BLINDMAN'S BUFF

Consists in one person having a handkerchief bound over his eyes, so as to completely blind him; and thus blindfold, he is called "Buff," and chases the other players either by the sound of their footsteps, or their subdued merriment, as they scramble away in all directions, endeavouring to avoid being caught by him; when he succeeds in catching a player, and guesses his name rightly, the player caught must in turn be blindfold, and the game be recommenced. In some places, it is customary for one of the players to inquire of Buff (before the game begins) "How many horses has your father got?" to which inquiry Buff responds "Three." "What colours are they?" "Black, white, and gray." The questioner then desires Buff to "turn round three times, and catch whom you may," which request he complies with, by trying to capture one of the players. It is often played by merely turning the blindfold hero round and round, without questioning him, and then beginning. The handkerchief must be tied on fairly, so as to allow no means for Buff to see; and whenever he approaches anything that may hurt him, he should be warned, as by the cry of "table," "chair," &c.

## SHADOW BUFF.

**SHADOW BUFF** differs very materially from blindman's buff, but it is equally amusing. A sheet or table-cloth should be fastened neatly up at one end of the room, so that it hang free from wrinkles. Buff, (not blindfold,) seats himself on a low stool with his face to the sheet; a table, on which is a lighted candle, should be placed about four or five feet behind him, this being the only light in the room. Buff's play-fellows next pass in succession, between the candle and him, distorting their features in as grotesque a manner as possible, hopping, limping, dressing themselves in bonnets, shawls, cloaks, or other disguises, and performing various antics, so as to make their *shadows* very unlike themselves. Buff must then try to guess to whom the shadows belong; and if he guess correctly, the player whose shadow he recognises, takes his place. Buff is allowed only one guess for each person, and must not turn his head either to the right or left, to see who passes.

## BUFF WITH THE WAND.

**THE** several players join hands, and form a circle around Buff, who stands in the middle, blindfold, and bearing a long wand or stick. The players then sing some chorus, and dance once round, when they stop, and Buff stretches forth his wand, which the person touched must take by the end. Buff then cries out three times, and the player caught answers in a counterfeit voice; but, if Buff guess his name rightly, they change places. Should, however, Buff guess wrong, the wand is released, and he continues to guess until he names some one correctly. Sometimes Buff pays a forfeit on each failure, as does each player on being caught and named.

## JINGLING.

**THIS** is a west-country sport, and may be played in a large apartment, or out-of-doors; if the latter, within a rope ring. A player has a bell fastened to his elbow, or holds one in his hand, which he keeps jingling, and whence he is called the jingler: he endeavours to avoid the several other players, who are blindfold, and who strive to capture him; the jingler may jump from and shun the others as he best may; whilst they follow the sound of the bell, and, not being able to see, tumble against, and over each other, thus affording great amusement to the spectators. Whoever catches the jingler within an agreed time, generally twenty minutes or half an hour, wins the prize; but if after this time the jingler be not caught, he is accounted the winner.

**HUNT THE SLIPPER.**

THIS old-fashioned pastime need scarcely be described. Several boys seat themselves in a circle on the ground, and another, who stands within the ring, gives a slipper to one of the players, by whom it is secretly handed to one of his neighbours; it is then passed round from one sitter to another, so as to completely perplex the "hunter," (or player standing in the middle,) in his endeavours to find the slipper, and who must continue his search until successful; the player in whose possession it is found, must in his turn "hunt the slipper," whilst the former hunter joins the sitters. Sometimes, to mislead the hunter, a player raps the slipper on the ground, and instantly passes it on.

**HUNT THE WHISTLE.**

To a whistle should be attached a piece of string, and a bent pin for a hook. The players seat themselves on the floor in a circle, as for the Slipper, except one lad who has never before seen the game, and is to be the hunter. He conceals his face in a player's lap, whilst another hooks the whistle on to his jacket, then blows it, and dexterously lets it fall so that another player may as quickly pick it up, and blow it. The hunter naturally turns towards the player whence the whistling proceeds, but no sooner is it heard in one place than it is repeated in another; and thus the hunter is perplexed to find the possessor of the whistle, although it be hanging at his own back.

**PUSS IN THE CORNER.**

FOUR players take their stations in the four corners of a room, and a fifth called "Puss" places himself in the middle of it; the players in the corners then change their positions in a regular succession, and the Puss endeavours to gain one of the vacant corners before the successor can reach it; if he can do so, the player left out becomes Puss.

**THREAD THE NEEDLE.**

A NUMBER of boys all join hands, and the game is begun by the outside players at each end of the line holding the following dialogue: "How many miles to Babylon?" "Threescore and ten." "Can I get there by candlelight?" "Yes, and back again." "Then open the gates without more ado, and let the king and his men pass through." The player and the one next to him at the end of the line opposite the last speaker then raise their joined hands as high as they can, to allow the speaker to run under, and the whole line follow him, still holding hands.

This should be done, if possible, without breaking the line by letting the hands go, and is styled "threading the needle." When all the boys have passed through, the dialogue is repeated, except that the player who before replied, now asks the question, and runs between the opposite players, the others following as before.

#### PROSTRATE AND PERPENDICULAR.

Cross your arms on your body, lie down on your back, and then get up again, without using either your elbows or hands in the feat.

#### THE STOOPING STRETCH.

CHALK a line on the floor, and place on it the outer edge of the right foot, at a little distance behind which, put the left heel on the line. Bend down and pass the right hand between your legs, under the right knee, and, with a piece of chalk in your right hand, draw a line on the floor, as far from the former line as you possibly can; yet not so far but that you can easily recover yourself without touching the ground with your hands, or removing your feet from the line. Provided you keep your feet properly placed, your body may project beyond the chalked line.

#### CATCH PENNY.



PLACE on your elbow three or four penny-pieces in a pile, as represented in the annexed figure; then drop your elbow very quickly, so as to bring your hand rather below the place where your elbow was, and try to catch the money before it falls to the ground; a few trials will enable you to perform this trick with the greatest facility.

#### THE TANTALUS TRICK.

LET a person stand with his back and heels close to a wall, then place a shilling on the floor, at a little distance in front of him, and tell him he shall have the money if he can take it up without advancing his heels from the wall. Although at first sight it appears very easy to perform this trick, yet it is impracticable; as it is impossible to stoop in consequence of the proximity to the wall.

## ANOTHER TANTALUS TRICK.

PLACE the left leg and foot, and left cheek, close against a wall ; then lift the right leg slowly, endeavour to touch the left knee with it, and stand steadily in that position.

## THE TRIUMPH.

THIS is a very excellent feat, and requires great practice to perform it adroitly : put your arms behind you and bring the palms of your hands together, the fingers downward, and the thumbs next your back ; then turn your hands, keeping the tops of the fingers close to your back, and the palms still together, until the ends of the fingers are brought between your shoulders, pointing toward your head, and the thumbs outside.

## DOT AND CARRY TWO.

THIS feat is to be performed by three players — whom we will name, A, B, C,—in the following manner. Let A stand between B and C, and stooping down, pass his right hand behind the left thigh of B, and grasp B's right hand ; he should next pass his left hand behind the right thigh of C, and grasp his left hand ; B and C should then each pass an arm round the neck of A, who, rising by degrees, will be able to lift the others from the floor.

## JUMPING THROUGH YOUR FINGERS.

HOLD a piece of wood of the size of a common cedar pencil between the forefinger of each hand, as represented in the annexed figure, and without letting go, try to jump over it both forward and backward ; with a little practice it can be done very easily, the feat mostly consisting in the difficulty of clearing the heels ; so that it can only be performed with low-heeled boots or shoes. You may also jump over your middle fingers placed together, without touch-



ing or separating them with your feet.

## KNUCKLE DOWN.

PLACE the toes against a line chalked on the floor, kneel down and get up again without using the hands, your feet having the same position as at first.



## CHAIRING THE LEG.

HAVING put your left foot on the lowest back rail of a strong chair, firmly placed so as not to be liable to slip, carefully try to pass your right leg over the back of the chair, and bring it to the floor between your left leg and the chair: in performing this trick, it is not allowable to touch the chair with your hands.

## THE LONG REACH.

CHALK a line on the floor, and place the toes of both feet on it,



being careful that they are not beyond it; then, throw forward either the right or left hand, so far that you can easily spring back and regain your upright position without either moving the feet from the line, touching the floor with the hands in

throwing them forward, or in springing back. Having thus stretched as far forward as you possibly can, whilst supporting the body upon one hand, with the other chalk a line on the floor, as shown in the illustration. You may, in order to bring your body lower, move your feet backward from the line marked on the floor, and by so doing you will be enabled to make a much greater stretch than you could otherwise have done. If you can chalk two lines, your own length apart, it is a tolerably good stretch; but with a little practice, you may chalk much further. Some persons, in performing this feat, rest upon their elbows instead of their hands.

## TO TAKE A CHAIR FROM UNDER YOU WITHOUT FALLING.

To perform this feat, lie along on three chairs, the middle chair being lighter than that at each end. Throw up your chest, keep your shoulders down, and your limbs as stiff as you possibly can; then take the centre chair from under your body, carry it over, and replace it under your body on the opposite side.

## THUMB SPRING.

PLACE the inside of the thumb on the edge of a table, taking care that neither the fingers nor palm of the hand touch it; next move your feet as far back as you possibly can, and then taking a spring from the thumb, recover your standing position, without shifting your feet forward. It will facilitate the spring, if you rock yourself to and fro, three or four times, before you take it.

## THE FLYING BOOK.

HOLD between your ankles and the inner side of your feet a book; then by kicking up backward with both your feet, jerk the book over your head.

## THE PALM SPRING.

STAND at a little distance from a wall, or fence, with your face toward it, and lean forward until you are able to place the palm of your hand quite flat on the wall, you must then take a spring from the hand, and recover your upright position, without moving either of your feet. It is better to practise it first with the feet at a little distance only from the wall, increasing the space as you gradually attain greater proficiency in the exercise.

## THE FINGER FEAT.

PLACE your arms in a straight line across your breast, letting the fore-finger of one hand rest on the side of the other, which another player should endeavour to separate in pulling by each arm; but if you hold them firmly in the manner described, he will be unable to achieve it, although he may be much stronger than you are. He must not, however, use sudden or violent jerks in his attempts, but employ only a steady, regular pull.

## THE TURN-OVER.

TAKE a short run, place the toe of the right foot against a wall, and throw the left leg over it, making a complete turn at the same time; so that when your left foot touches the ground, your back is to the wall. The right foot is the pivot, and you must take especial care to keep it quite close to the wall, while you perform the turn-over. This feat requires only a little practice to enable you to perform it with rapidity.

## LEAP BEFORE YOU LOOK.

TAKE a strong chair, with so narrow a back, that you can bestride it without difficulty: stand on the seat, put your hands on the top rail of the back, and rest your knees against the middle rail; then push the chair forward until it rest only on its hind legs, and before you lose your balance, jump from the seat, so that when you alight on the floor, you still hold the back rail in your hand. In all feats with chairs, it is necessary to use great caution in making the first attempts.

**EASIER TO CARRY TWO WEIGHTS THAN ONE.**

**LIFT** a single dumb-bell in one hand, and its great weight will overbalance the body; but, if you take the remaining dumb-bell in the other hand, you will be enabled to carry both bells with much greater ease than before.

**TUMBLE-DOWN DICK.**

**PLACE** a strong, high-backed chair on the floor, back upwards, and lay a shilling at the end or about the middle of the back. Next, kneel on the hind legs of the chair, and hold with both hands near the seat-rail; then bend down, and endeavour to touch the back of the chair with your face, and take up the shilling with your mouth; being careful that you do not fall forward, or allow the top of the chair to touch the ground. In this feat, the chair may be held either higher up or lower down the back, as the player may find necessary.

**BREAST TO MOUTH.**

**MEASURE** the length of your arm, from the outside of the elbow to the tip of the middle finger, as shown in the annexed illustration, fig. 1, and mark it on a stick; next, hold the stick before you, with your elbow close to your side, as in fig. 2, placing the middle finger upon the mark, and grasping the stick, as in the engraving. Then, try to raise the left end of the stick from its horizontal position up to your mouth, which should be done without changing the place of either your fingers, your head, or your elbow. This feat is beset with difficulties, which, however, may be mastered by practice.

**THE HUNTSMAN.**

**THIS** game is one of the liveliest winter's evening pastimes that can be imagined: it may be played by any number of persons above four. One of the players is styled the "hunter," and the others must be called after the different parts of the dress or accoutrements of a sportsman; thus, one is the coat, another

the hat, whilst the shot, shot-belt, powder, powder-flask, dog, and gun, and every other appurtenance belonging to a huntsman, has its representative. As many chairs as there are players, ex-



cluding the "huntsman," should next be ranged in two rows, back to back, and all the players must then seat themselves; and, being thus prepared, the "huntsman" walks round the sitters, and calls out the assumed name of one of them; for instance, "Gun!" when that player immediately gets up, and takes hold of the coat-skirts of the "huntsman," who continues his walk, and calls out all the others, one by one; each must take hold of the skirts of the player before him, and when they are all summoned, the huntsman sets off running round the chairs as fast as he can, the other players holding on and running after him. When he has run round two or three times, he shouts out "Bang!" and immediately sits down on one of the chairs, leaving his followers to scramble to the other seats as they best can. Of course, one must be left standing, there being one chair less than the number of players, and the player so left must pay a forfeit. The game is continued until all have paid three forfeits, when they are cried, and the punishments or penances declared. The huntsman is not changed throughout the game, unless he gets tired of his post.

#### THE GAME OF THE KEY.

THIS game may be played by any number of persons, who should all, except one, seat themselves on chairs placed in a circle, and he should stand in the centre of the ring. Each sitter must next take hold, with his left hand, of the right wrist of the person sitting on his left, being careful not to obstruct the grasp by holding the hands. When all have, in this manner, joined hands, they should begin moving them from left to right, making a circular motion, and touching each other's hands, as if for the purpose of taking something from them. The player in the centre then presents a *key* to one of the sitters, and turns his back, so as to allow it to be privately passed to another, who

hands it to a third ; and thus *the key* is quickly handed round the ring from one player to the other ; which task is easily accomplished, on account of the continued motion of the hands of all the players. Meanwhile, the player in the centre, after the key has reached the third or fourth player, should watch its progress narrowly, and endeavour to seize it in its passage. If he succeed, the person in whose hand it is found, after paying a forfeit, must take his place in the centre, and give and hunt the key in his turn ; should the seeker fail in discovering the key in his first attempt, he must continue his search until he succeeds. When a player has paid three forfeits, he is out.

### THE TWO HATS.

THIS is a Neapolitan game, and from the contradictory nature of its words and actions, resembles the child's pastime of "the rule of contrary." The rules are that, if three mistakes be made, by the person who responds to the inquiries of the player bringing the hats round, and whom, for distinction's sake, we will call the Questioner,—he must pay three forfeits, and be out of the game ; when the questioner desires the respondent to be seated, the latter must stand up ; when he begs him to put his hat on, he must take it off ; when he requests him to stand, he must sit ; and in every point, the respondent must do the reverse of what the questioner tells him. The questioner may sit down, stand up, put his hat on, or take it off, without desiring the respondent to do so, or giving him the least intimation of his intention ; the latter must, therefore, be always on his guard, so as to act instantly to the contrary, else he incurs a forfeit. These rules being settled, the game is simply this :—a player places a hat on his head, takes another in his hand, and gives it to one of the company ; he then begins conversing with him, endeavouring both by words and actions to puzzle him, and cause him to *forfeit*. The following is a specimen of a dialogue, and the accompanying movements of the hats, in which A is the questioner, B the respondent :—

A. (*taking his hat off.*) A very beautiful evening, sir.

B. (*putting his hat on.*) Yes, indeed, a most lovely one.

A. (*putting his hat on, and sitting down, B instantly taking his off and getting up.*) Pray be seated, sir ; I really cannot think of sitting while you stand ; (*gets up, and B sits down.*) Have you been out of town this year ? (*takes off his hat.*)

B. (*putting his on.*) I have not yet, but I think I shall before (*A sits down, B gets up*) the beauty of the season has entirely passed away, venture a few miles out of town.

A. (*putting his hat on.*) I beg ten thousand pardons, you are

standing while I am sitting; pardon me, your hat is on, you must pay a forfeit.

It generally happens, that before the dialogue has been carried thus far, the respondent has incurred three forfeits, and is, of course, out; the questioner then goes in succession to the others, and the same scene is repeated by each; the conversation, it is almost needless to add, should be varied as much as possible, and the more absurd the better.



THE KNIGHT OF THE RUEFUL COUNTENANCE.

#### PENANCES FOR FORFEITS.

As the three foregoing games end with crying the forfeits incurred in them, and as there are many other games for long winter evenings, which our limits compel us to omit, ending in the same manner, we subjoin a few penances, (of Neapolitan origin,) to be imposed on those who have been unfortunate enough to incur them.

1. **THE KNIGHT OF THE RUEFUL COUNTENANCE.** The player whose forfeit is cried, is called the "Knight of the rueful countenance:" he must take a lighted candle in his hand, and select some other player to be his squire Sancho Panza, who takes hold of his arm, and they then both go round to all the ladies in the company. It is the squire's office to kiss the hand of each lady, and after each kiss to wipe the knight's mouth with a handkerchief, which he holds in his hand for the purpose. The knight must carry the candle throughout the penance.

2. **THE COUNTRY TABLE.** In this penance, the owner of the forfeit selects some one to be secretary, then kneels down

upon his hands and knees on the floor, to represent the table, and his secretary takes his stand beside him. One of the company next dictates to the secretary, who should move his hand on the back of the kneeling player, as if he were writing a letter; the dictator must call out "comma!" when he wishes that stop to be made, which the secretary responds to by making a motion with his finger on the "country table," resembling that stop; a "semicolon," by giving a knock with his fist on the table and making a comma; a "colon," by giving two knocks; and a "full stop," by one. For the sake of losing as little time as possible in one forfeit, it is not necessary to request more than the points or stops to be made on the "country table."

2. **JOURNEY TO ROME.** The person whose forfeit is called, must go round to every individual in the company to tell them that he is going on a journey to Rome, and to assure them if they have any message or article to send to his Holiness the Pope, he will feel great pleasure in taking it. Every one must give something to the traveller, no matter how cumbrous it may be, or awkward to carry, (indeed, the more inconvenient the articles are, the more it increases the merriment,) until he is literally overloaded with presents. When he has gathered from all, he walks to a corner of the room, puts the articles down, and so his penance ends.

4. **THE CUSHION.** The owner of the forfeit takes a cushion, and gives it to one of the company, who then kneels down on the floor, holds the cushion a little before him, and requests the bringer to kneel down on it; as the latter attempts to kneel, the former slides the cushion away, so that the unlucky wight kneels on the carpet instead; should he, however, be fortunate enough to kneel on the cushion at once, he takes it to the next player; but if not, he must continue his attempts until he is successful. The cushion is to be given to every one in the room in rotation, and the kneeling penance above described repeated before each.

5. **THE STATUE OF LOVE.** The player who owns the forfeit cried, takes a candle in his hand, and is led by another to one end of the room, where he must stand and represent the Statue of Love; one of the players now walks up, and requests him to fetch some lady, whose name he whispers in Love's ear; the statue, still holding the candle, proceeds to execute his commission, and brings the lady with him; she in turn desires him to fetch some gentleman, and so it continues till all have been summoned. The players brought up by Love, must not return to their seats, but stand in a group round Love's standing-place, until he has brought the last person in the company, when they hiss him most vigorously, and the forfeit terminates.

## SCHIMMEL, OR THE BELL AND HAMMER.

To play this amusing game requires five cards of figures, viz a white horse, an inn, a bell, a hammer, and a bell and hammer; eight little ivory cubes, marked on one side only; six numbered 1, 2, 3, 4, &c., and the other two marked, one with a bell, and the other with a hammer; a box for throwing the dice; a hammer for disposing of the cards by auction, and a proportionate number of counters for the players. The game may be played by as many persons as are present.

The counters are then to be distributed by one of the party who has the office of cashier; their value having been previously determined upon by the players. This being done, twelve are to be deposited by each player in the pool. The cashier then disposes of the five cards, separately, to the highest bidder, the produce being also placed in the pool. The bidders are not bound to confine themselves to the number of counters dealt out to them at the beginning of the game; should they exceed it, they may pay the remainder of the debt by instalments, out of their receipts, in the course of the game.

Each person is at liberty to purchase as many cards as he may think proper.

The dice are to be thrown by the players alternately, beginning with the holder of the White Horse; any one being allowed to dispose of his throw to the highest bidder. When all blanks are thrown, each of the players pays one to the holder of the White Horse, and he pays one to the Inn. If with the blanks, the Bell, or Hammer, or the Bell and Hammer together, are thrown, the possessor of the card so thrown pays one to the White Horse.

When numbers accompany the Bell, Hammer, or Bell and Hammer, the cashier is to pay counters, to the amount of numbers thrown, to the holder of such card, from the pool; but if numbers be thrown unaccompanied, the cashier then pays to the thrower.

When the pool is nearly empty, there arises an advantage to the Inn, for if a player throws a figure greater than the quantity contained in the pool, he pays the overplus to the Inn, thus: suppose 4 are in the pool, if the player throw 10, he is to pay 6 to the Inn; and if 2 be thrown, those 2 are paid to him from the pool, and so on till a figure is thrown which clears the pool, and concludes the game.

If all blanks be thrown after the Inn begins to receive, the players pay nothing, but the owner of the White Horse pays one to the Inn; should the Bell, &c. be thrown with the blanks, the holder of that card pays one to the Inn; and



if numbers accompany the Bell, &c. the holder of that card must pay to the Inn the number thrown above those remaining in the pool.

#### DIBS.

THE Dibs are five of the small cramp or trotter bones of sheep, with which various feats are performed. First, the player extends his first and middle finger, and having placed on the back of them a Dib, he throws it up, and catches it in his hand, or on the inside or back of his fingers; and then increases the number of Dibs to two, three, four, and five, which are thrown up separately or together. A single dib is then held between each of the fingers and thumb of the left hand, whence they are thrown in regular succession to the right hand; and the modes of jerking and picking up the Dibs may be amusingly varied. The order of the game is, that as soon as one player fails in the feat he attempts, another player takes up the Dibs.

#### THE GAME OF FINGERS.

THIS game, also called Mora, is of great antiquity; its invention being inscribed to Helen, who, it is said, was accustomed to play at Mora with Paris, the son of Priam. The game may be played by two or four persons, and usually consists of six points; but this is settled by the players, who then present as many fingers as they choose, calling aloud some particular number; and, if either of the numbers thus mentioned agree with the amount of fingers presented, he who named it counts one towards his game, by holding up a finger of the left hand, or sometimes a fist or elbow. But neither player is permitted to count it; on the contrary, both numbers are incorrect. When a player exclaims "all!" he must display his open hand; and the point is won if his rival, at the same time, exhibit all his fingers.

Dumb Mora is played as above, but with this exception: that instead of calling the numbers, the players, before they commence the game, agree by what mode they shall designate odd and even; after which, whoever utters a syllable, incurs a forfeit. Should any difficulty arise during the progress of the game, no words are allowed to be spoken, but the required explanation must be given and received by signs.

#### DUMB MOTIONS.

THIS dramatic game exercises considerably more ingenuity than its name implies. It is played by sides, who toss up for innings. The winning side retire to some distance, and choose some trade or professional employment, which may be *acted*, or represented by "Dumb Motions." They then advance to the

other side, and one of them calls out the first and last letter of the name of the trade they are about to represent. Thus, suppose it to be B——r, (Bricklayer); some of the players imitate with their hands the spreading of mortar and laying of bricks; another appears to carry on his shoulder the hod, &c. Or, if the letters be S——n, (Stonemason,) some appear to be chipping stone, and others sit as if they were sawing stone: the more mechanical the trade the better. Each of the opposite side then guesses within a few minutes, and if neither be correct, the trade is named by the "in" party, who choose another trade. But, should the trade be rightly guessed, the sides change places. Should either of the side misrepresent the trade, or speak during the work, or name the letters incorrectly, the whole side are *out*, and a workman is not unfrequently thrown off his guard by the opposite party asking him a question, which, if he answer, he is at fault. Sometimes, the working side are called *men*, and those who guess are *masters*.

#### SNAP-APPLE.

THIS is a Christmas sport, and is played as follows: an apple is fixed upon one end of a short stick, to the other extremity of which is fastened a lighted candle. A string is then tied to the middle of the stick, by which it is suspended from the ceiling at such a height that the young people may catch or "bob" at it with their mouths, their hands being tied behind their backs.

#### SNAP-DRAGON

Is another Christmas pastime. A dish of raisins being prepared, some heated brandy or spirits of wine is poured over the fruit, and then set on fire, the other lights in the room being extinguished. The young folks then stand round the dish to pluck out the lighted raisins, and eat them as hastily as they can, but rarely without warming their hands and mouths. The blue flames of the burning spirit, and the singular and spectral appearance which they give to the faces of the busy crowd, are a source of considerable merriment.

## OUT-OF-DOOR SPORTS.

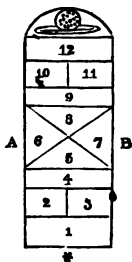


### DRAWING THE OVEN.

LET any number of boys seat themselves, one behind the other on the ground, and clasp each other round the waist; two players should then take hold of the foremost sitter, by both his hands, as represented above, and endeavour to detach him from the line, by pulling away vigorously. When they have succeeded in doing this, they take hold of the second sitter in the same manner, and so continue "drawing the oven," until they have drawn all the players from the ground. This game is also called "Jack, Jack, the bread burns."

### HOP-SCOTCH.

CHALK or mark on the ground a figure similar to the one in the engraving. When it is finished, all the players "pink" for innings: that is, they each throw a piece of tile, or a round dump made of lead, towards the "pudding" or semicircular top of the figure, which is so called on account of a rude representation of a plum-pudding in a dish, being usually sketched within it; the player who can manage to pitch into the pudding, takes the first innings, and if two or more pitch in, they are "ties," and must "pink" again. The winner begins, standing at \*, by throwing his piece of tile or lead into the division marked 1, he then hops into the space, and kicks the tile out to \*; he next throws the tile into 2, hops into 1, then into 2, and kicks it out as before;



and he repeats this through the several numbers till he comes to 8, which is called a resting-bed; he is here permitted, after hopping through the previous seven spaces, to put his feet in the beds marked 6 and 7, and rest himself; but he must, of course, resume hopping, before he kicks the tile home; he then passes through the beds 9, 10, 11, as before directed; 12 is another resting-bed, in which he may put down both feet; and when he comes to plum-pudding, he must kick the tile out so as to send it through all the other beds at once; but to send the tile from any of the other beds, the players may use as many kicks as they please. The other rules of the game are the following: if the player throw the tile into the wrong number, or if it rest on one of the chalked lines, either when he has endeavoured to pitch it into a bed, or when he is kicking it out, he loses his innings; as also, if he place both feet down in any other than a resting-bed; or, if he in hopping out, put his foot on a line, or kick the tile over the side lines, A, B. The figures are differently drawn: sometimes, a circle P is introduced towards the top, into which, should the player pitch the tile, he is out; the numbers of the bed may likewise be omitted, and their order left to the memory. If the first player put himself out, the second player begins from \*; and should he also not go through, the first takes up his game where he left off; and the second does the same, should the first put himself out a second time.

#### HOPPING BASES.

SIDES are chosen, and each player has his opponent; and the parties enter their bases formed by a line drawn the length of the ground. Each player then folds his arms, hops on one leg, and strives to get into the opposite base; which should he do, the vanquished one must retire from the game. The victor in this instance may then return to aid his own party; and the game is won by those who, whilst hopping, take entire possession of the enemy's base. Should any player drop the leg, he is out of the game.

#### WHOOOP.

ONE player takes his station at a spot called the "home," while the others go to seek out various hiding-places in which to ensconce themselves; when all are ready, one of them calls out "Whoop!" on which the player at the "home" instantly goes in search of the hidiers, and endeavours to touch one of them, as they all run back to "home;" if he can do so, the one caught takes his post at the home, and he joins the out-players.



#### FRENCH AND ENGLISH.

THIS is an exceedingly lively and amusing game: it is played by two parties, as nearly equal in numbers and strength as can be mustered; one party take hold of one end of a strong rope, whilst their antagonists take hold of the other; each party then strive to pull the other over a line chalked or marked on the ground for the purpose, and those who are so pulled over, being made prisoners, lose the game.

#### TAG OR TOUCH.

ANY number of boys can play at this game, which is an exceedingly spirited one. One of the players undertakes to be "Tag," or "Touch," and endeavours to touch one of the others as they are running about in all directions, trying to avoid him as much as possible; if he can touch one, the player caught becomes Touch, and in his turn strives to touch one of his fellow-players. "TOUCH IRON" and "TOUCH WOOD" are frequently called; and when the boys can touch either iron or wood, Touch has no power over them; but the moment they quit either, they may be "touched;" and sometimes a touch makes prisoners.

#### CROSS-TOUCH.

In this sport, when Touch is following one player, another runs across his path, between him and the party pursued; upon which Touch must immediately run after the one who crossed, until some other crossing between them, must, in his turn, be followed; and so it continues changing, until Touch catches one, who takes, of course, the office of Touch, and the game is continued as before.

#### HUNT THE HARE.

ONE boy is chosen "Hare," and runs out, when, his comrades having given him "law," that is, time to run a certain distance, they then give chase and endeavour to catch Hare before he returns home.



#### BASTE THE BEAR.

THE players toss up for the first Bear, who kneels on the ground within a marked circle; each selects his own master, whose office it is to hold him by a rope, and use his utmost efforts to touch one of the other players, as they try to "baste" the Bear with their handkerchiefs knotted and twisted very tightly. If the Bear's master can touch one of the assailants without dragging the Bear out of the ring or letting the rope fall, the boy touched becomes Bear, selects his keeper as before mentioned, and the sport is continued.

#### HIDE AND SEEK.

IN this game, one of the players hides a handkerchief, or any little article which can be easily secreted, and then desires the other players to find it; the successful seeker, in his turn, hiding the same thing next time. When the seekers approach the place of concealment, the player who hides the article must answer their questions, whether "they burn;" and on the contrary, when they wander from it, he should tell them that they "freeze." The Greeks had a pastime similar to our Hide and Seek: a boy seated himself in the midst of his comrades, and closed his eyes, or was blindfolded by the hand of another, whilst the rest concealed themselves; and he who was first found by him after he was permitted to rise, took his place. There is another kind of Hide and Seek, called also Whoop and Hide; where one party of boys remain at "home," while the others go out and hide themselves; when they are hid, one of them cries "Whoop," as a signal for those at home to seek after them. If the hidden can escape the vigilance of the seeker, and reach home unseen, they go out to hide again; but so many of

them as are caught, on the contrary, become seekers, and those who catch them have the privilege of hiding themselves.

#### DUCK STONE.

THIS game cannot be played by fewer than three boys; and if the number be eight or ten, its interest and liveliness are increased. It should not, however, be played roughly or carelessly, as the players, through negligence, may injure each other from the weight of the stones, and the force with which they must be cast. A large smooth and flat-topped stone is placed on the ground, and at about six or eight yards distance is marked "home." Each player next provides himself with a pebble stone somewhat larger than a cricket-ball; and the game is begun by "pinking" for "duck," i. e. by all standing at the "home," and throwing their pebbles in succession at the large stone; and the player whose pebble falls or rolls furthest from the large one, becomes Duck, and must place his stone on it. The other players next cast their pebbles at it singly, from the "home," and then hasten to pick up their pebbles, so as to throw again; but, if Duck can touch either of them before he reaches "home," and should Duck's own pebble not be knocked off the large stone, then the thrower thus touched becomes Duck; but, if he be quick, he may call out "Double duck" before Duck is able to kick his own pebble off the large stone, or cry out "Feign double duck," in which case both the "ducks" are to be placed on the stone together. Sometimes, the "duck" remains on the stone after four or five have thrown at it, when they allow their pebbles to rest, but in attempting to pick them up, Duck may touch either of the throwers; till, at length, another player knocks Duck's pebble from off the large stone; and as no one can be touched until it has been replaced, the several players gain time to take up their pebbles, and reach "home" for safety. Should all the players have thrown without being able to knock the "duck" off, it is frequently proposed by one, or more, to Duck, to take either a "heeler," a "sling," or a "jump," towards "home," in order that they may have a chance of reaching it. The "heeler" is performed by kicking the stone backward toward "home; the "sling," by putting the stone on the middle of the right foot, and slinging it in the direction of "home;" and the "jump," by placing the stone between the feet, and holding it there, while a jump is taken, and the stone let fall, so that it may roll forward; if the stone be, so far from "home," that one sling, jump, or heeler will not suffice, two, or more of each may be taken, provided Duck allows it; but if the player does not reach "home" in the number of slings, &c. agreed on, he becomes Duck.



## SADDLE MY NAG.

Two leaders should toss up for choice of sides, and each having selected six or eight partners, they should toss again for innings; the loser must then place himself quite upright, with his face to a wall, against which he rests his hands, and one of his partners should next stoop down, and put his head against his leader's skirts, as shown in the annexed engraving; another partner also bends, and places his head against the skirts of the second player, and the rest of the partners must take their places in the same manner, one behind the other; when thus ranged, they are called "Nags." One of the winning party next runs, and placing his hands on the back of the last Nag, cries "Warning," endeavours to spring on to the back of the first, or at least to clear as many Nags as he can, so as to leave room for those following him to leap on the backs of the other Nags, until they are all fairly astride. If any of the Nags sink under the weight, or in trying to support themselves, touch the ground either with their hands or knees,—or if the riders can keep their seats without touching the ground, whilst their leader counts twenty,—the riders resume their innings, and begin again; but should there not be sufficient space for all to leap on, or they are unable to keep their seats on the backs of the Nags, they lose their innings, and become Nags in their turn. The Nags may also cry "Weak horse!" when, if the riders do not instantly dismount, they must become Nags.

## BUCK

Is played by two boys, pretty nearly equal in size and strength; while a third is appointed umpire, to see that the rules are correctly followed, and no unfair advantage taken. One player then gives a back, that is, stooping down, as in leap-frog, and resting his head against a wall; the other player then springs on his



back, and holding up as many fingers as he pleases, calls out "Buck, Buck, how many horns do I hold up?" Buck endeavours to guess the probable number; if his guess be incorrect, the rider gets down, leaps on again, holds up his fingers, and repeats the question as before; and so continues, until Buck names the right number, when the rider must take the place of Buck, and Buck in turn jump on his back. It is, of course, unnecessary to hold up the same number of fingers every time the question is asked. Buck is usually blindfolded to prevent foul play, but this precaution is not requisite.

#### PRISONER'S BASE

Is a very lively and amusing game, and is played as follows: Two captains being appointed, they "cleep" for partners, *i. e.* they advance towards each other, by bringing, alternately, the heel of one foot to the toe of the other, until at last there be not room for one of them to put his foot down between the toe of his opponent and his own; this player has the first choice of partners. The best number for this game is seven or eight players on each side, although it may be played with either more or less. The bases are then drawn at one end of the ground, and are divided by a line, on each side of which the players stand. At some distance are marked the prisons, generally in corners of the ground; the prison of one party facing the base of its opponents, and lying crosswise from the base of its own party.

The game is begun by a player from one side running out between the bases and the prisons, when he is quickly followed by one of the opposite party, who endeavours to catch him; a partner of the first player next dashes out to capture the second, and so on, both sides sending out as many of their partners as they please, to touch or take their opponents. But a player must not touch any one who started after him, although the latter may, if he can, touch him before he gets back to his own base; but if a player has taken a prisoner, he cannot be touched in making his way back to his base again. A player can touch only one of his opponents each time he leaves his base; and every prisoner must be taken to the prison of the opposite party, where he remains till one of his own partners can manage to touch him; and this may be aided by the several prisoners holding each other by the hand in an extended line, ~~so as~~ to reduce the distance from the base. The player coming to rescue the captive must also have started from his base after the other has been taken; and the released prisoner and his companion are not allowed to touch any one, or to be touched, as they return home. The victors are those who can contrive, at the same period, to make all their opponents prisoners. Or,

instead of the prisoners being rescued, they are drafted into the enemy's base, and the game is terminated by all the players thus passing to one side.

Prisoner's Base is mentioned in proclamations in the reign of Edward III.; and Shakspeare speaks of "the country base." The game was formerly played by men, especially in Cheshire, and the adjoining counties.

#### RUSHING BASES.

DRAW two bases, with a wide space between them. All the players then station themselves in one base, except one boy, to be "King Cæsar," by choice or otherwise, and he places himself midway between the bases. The men then attempt to run from one base to the other, and the King strives to catch them; and whenever he takes one, he claps him on the head and cries thrice, "Crown thee, King Cæsar!" and he must thenceforth assist his Majesty in catching the rest of the men, each of whom must, as he is taken, join the royal party; the last man captured being King for the next game. The crowning must be distinctly pronounced thrice, else the captive can be demanded by his party.

#### STAG OUT.

A LINE should be drawn on the ground, at a little distance from a wall, to form "the bounds," and within which one of the players, as the "stag," stations himself; he then springs out, with his hands clasped firmly together, and endeavours to touch one of the other players, who all run from him. Should he succeed in touching one, he rides on his back home to the "bounds," and the player thus touched becomes Stag.

#### WARNING!

ANY number may play at this game. A base should be drawn at about four feet from a wall, within which one of the players takes his station, and after calling out, "Warning, once; warning, twice; warning, thrice; a bushel of wheat, a bushel of rye; when the cock crows, out jump I. Cock-a-doodle-doo!"—he jumps out, and runs after the others; if he touch one, they both return to the bounds, where they unite hands, and after crying "Warning!" only, rush out again, and each strives to touch an opponent; if they can achieve this, they all return and join hands as before; the next time they sally forth, the outside players *only* try to touch; of course, every one they touch returns to "bounds" with them, and joins the line. Should the out-players attack, break the line, and put the party to the rout,

which it is always their object to do, the discomfited players must scamper back to "bounds;" this the out-players endeavour to prevent by capturing them, which, if they can accomplish, the captives are compelled to carry their captors back to bounds. After a player has sallied from the bounds, and has touched one of the out-players, he should run home with all speed, to avoid being caught by their opponents. When three players have been touched, the one who began the game may join the out party.



SEE-SAW.

For this amusement a stout plank should be laid across a felled tree, or a dwarf wall; it must be very nicely balanced if the players be of the same weight, but if one be heavier than the other, the end on which he intends to sit, should be the shortest. Two players then take their seats on the plank, one at each end, whilst a third stations himself on the middle of it, as represented in the illustration; the name of this player is, in some places, "Jack o' both Sides," and in others "Pudding." As the players by turns make slight springs from their toes, they are each alternately elevated and depressed; and it is the duty of Pudding to assist these movements by bearing all his weight on the foot on the highest end of the plank, beyond the centre of the tree or wall on which it rests. This will be best understood by referring to the illustration: thus, A is the trunk of a tree, across it a plank is laid, on which two players, B, C, take their seats; D is Pudding; it will be seen that his left foot is beyond the centre of the trunk A, on the highest end of the board, and consequently, his weight being added to that of B, will depress that end of the plank, and the end on which C sits must, of course, rise;

Pudding then bears on his right foot, and C in turn descends; and thus the game continues, Pudding bearing alternately on each side. Again, a boy, by riding on the longer arm of the plank, may balance a man twice his weight!

A see-saw is one of the earliest lessons in mechanics. The cross plank is the *lever*, or first mechanical power; and its supporter, the felled tree, is the *fulcrum*, or prop by which the *lever* is sustained. A reckoning-stone is a natural see-saw.

#### LEAP-FROG.



THIS game will be best understood by supposing that eight boys are playing at it: seven of them stand in a row, about eighteen feet apart, with their sides to the leapers, hands on their knees, body doubled, and head bent down, as shown in the first cut. The eighth player then takes a short run, and, placing his hands on the back of the first player, leaps over him; then over the second, and, in like manner, over all the other players, one after the other; he then places himself down in the line, in the proper position, and at the right distance from the last player; the first over whom he jumped, rises immediately he has passed, and follows him over the second, third, &c., who all rise in succession, and leap in their turns; and after they have successively jumped over the last players, they place themselves down in the line, as before described; and the game continues. Some players stand with their backs to the leapers, as in the second cut, instead of their sides; the mode is optional, although in some places it is usual to compel those who can jump over the head, to do so.

#### FLY THE GARTER.

CHALK or make a line, or "the garter," on the ground; on this line one of the players must place himself and bend down as

in leap-frog, while the other players in rotation leap over him; the last one, as he flies over, calling out "Foot it;" if he should fail in giving this notice, he is out, and must take the other boy's place at the garter: the boy, immediately the word is given, rises, and places his right heel close to the middle of the left foot, he next moves the left forwards and places that heel close up to the toes of his right foot, and bends down as before; this movement is called a "step," and is repeated three times. The other players should fly from the garter each time a step is made, and the last player must invariably call out "Foot it," as he leaps over. After making the three "steps," the player giving the back takes a short run; and, *from* the spot where he made his last step, he jumps as far forwards as he possibly can, and bends down again; the others jump from the garter, and then fly over. Should any of the players be unable to jump easily over the one giving the back, and rather slide down upon, or ride on him, the player so failing must take the other's place at the garter, and the game be recommenced; if, also, through the impetus acquired in taking the jump from the garter, a player should happen to place his hands on the back of the player bending down, and then withdraw them in order to take the spring over, he is out, and must take his turn at the garter. Sometimes, the boy giving the back takes a hop, step, and a jump after he has footed it three times; the other players doing the same, and then flying over.

#### DUCK AND DRAKE

Is played by "shying" bits of slate, or tile, the flat shells of oysters, or thin smooth stones, on the surface of a pond. Whatever is used should be "shied" so that it may merely touch the surface of the water, otherwise it will not rebound several times, which it is the aim of the player to make it do; if it rebound once, it is a "Dick;" if twice, a "Duck;" if thrice, a "Dick, Duck, and Drake;" and that player wins the game whose slate or shell rebounds the oftenest.

#### KING OF THE CASTLE.

ONE player stations himself on a mound of earth, or eminence, and styles himself "King of the Castle:" from this station his playmates endeavour singly to pull or push him off, whilst he exerts his utmost efforts to repel them, and maintain his position. Whichever player dethrones the king, takes his place.

#### DROPPING THE HANDKERCHIEF.

A TOLERABLY large ring should be formed by several boys joining hands: when all are ready, another boy who stands out, walks

round outside the ring, drops a handkerchief behind one of the players, and immediately runs off; he is instantly followed by the boy behind whom he dropped the handkerchief, and who must track him in all his windings in and out, under the raised arms of the boys in the ring, and indeed wherever he runs; should the pursuer touch the pursued, the former takes the handkerchief in his turn, and the latter joins hands in the circle. If the boy who dropped the handkerchief be enabled to elude his follower by passing through and about the ring, the latter walks round again, and drops it behind some other player.

#### HOP, STEP, AND JUMP,

Is a trial as to which of the players can go over the greatest space of ground in a hop, step, and a jump, made one after the other, without stopping. They may be commenced either with a short run, or else standing, at the option of the players.

#### CASTING THE BALL.

CASTING the wooden ball is an excellent recreation. A bowl similar in pattern to those used in skittle-alleys—not those used for nine-pins—should be procured; it must not, however, be so large nor so heavy as the bowls used by men, neither should the finger-holes be so wide apart; and the size and weight should always be adapted to the size of the person using it. In casting the ball, put your thumb in one of the holes, and your middle or forefinger in another, and then throw it underhanded either to a mark, or at random to a distance.

#### TWO TO ONE.

Two to One is a capital exercise with a common skipping-rope. It is done by skipping in the usual way for a short time, and then increasing the rapidity of your movements, and leaping tolerably high; at the same time, endeavouring to swing the rope round so quickly, as to pass it twice under your feet whilst leaping: practise this until you are proficient, and then try to pass the rope three times under your feet instead of twice.

#### LONG ROPE.

THE rope is held each end by a boy, and turned pretty regularly; and, when the line is at its highest, one, two, or more boys step forward between the holders, and jump up as the rope descends, so as to let it pass under their feet like the common skipping-rope. The leapers should keep time with the turns of the rope; and, if it touch either of them, he must change places with one of the holders.

Another game may be played by holding a long skipping-rope at one end in the outside hand, making a step or two towards the other player, with his "help" at the other end swinging it round, and then skipping over it.



"The school-boy still with dithering joys,  
In pastime leisure hours employs;  
And be the weather as it may  
Is never at a loss for play;  
Making rude forms of various names,  
Snow-men, or aught his fancy frames."—CLARE.

#### THE SNOW STATUE.

MAKING a snow statue forms a capital amusement when the fields "put on their winter's robe of purest white," and the icicles hang glistening from the eaves. In order to amass snow enough for the purpose, it should be swept up into one spot, or, to insure the snow being clean, a large snow-ball should be made, and rolled about until it becomes huge and unwieldy. The material being thus provided, the statue should be rounded and shaped as neatly as possible; and, if the young artists possess ingenuity enough to make their work look something like a *man*, and not a heap of snow, so much the better. The modellers

now, by common consent, withdraw to a stated distance and begin to pelt their handy-work with snow-balls, until the gigantic figure falls, feature by feature, amidst the shouts of the joyous throng.

A lively game is likewise afforded by one party building a fortification of snow, behind which they post themselves; and, having provided themselves with snow-balls, they repel the attacks of another party from without, who endeavour to drive them from the work, by pelting them vigorously with snow-balls; the besieged, of course, returning the shower of balls. These balls should not, however, be pressed too tight, else they may be so hard as to render the mimic siege a dangerous one.

Sir Walter Scott relates of Napoleon Buonaparte, that when at school in Corsica, he, one winter's day, engaged his companions in the play-ground in constructing a fortress out of the snow, regularly defended by ditches and bastions, according to the rules of fortification. It was attacked and defended by the students, who divided into parties for the purpose, until the battle became so keen that their superiors thought it proper to proclaim a truce.

#### SNOW AND ICE HOUSES.

THE building of houses with snow, which boys sometimes practise as a pastime in this country, is a matter of necessity in the Arctic regions. Sir John Ross tells us that in the newly-discovered peninsula of Boothia, the poor Esquimaux build villages of snow huts, having the appearance of inverted basins, and lit by windows of clear ice. They are built with wedge-shaped blocks of snow, the joints being also fitted in with snow; and so rapidly is this done, that a house is often roofed within an hour; and a tent is scarcely built in less time. The Esquimaux children have also a toy architecture of their own, and build houses with equal dexterity.

We read, too, of mansions being built entirely of ice, in some northern countries. Such was the magnificent ice-palace of the Empress Anne, which was erected at St. Petersburg, in January, 1740. It was 56 feet in length, and 21 feet high; it was built of the most transparent ice, cut from the Neva in large blocks, which were squared with rule and compass; and water being poured between the blocks, it froze and served as cement or mortar. The interior was completely fitted up; a bed-room had a suite of furniture entirely in ice. On the outside of the palace were cannons and mortars from which iron balls were fired. The whole fabric lasted about ten weeks, and then melted away. In the same year, a winter of unusual severity, a German carved in ice at the gate of Holstein, in Lubeck, a lion seven feet long, surrounded by a bulwark of ice, on which were placed five cannons a soldier, and a sentry-box all of ice.



## FOLLOW MY LEADER.

A SPIRITED boy should be chosen as Leader, and the other players must follow him in a line: he commences the game by jumping, running, hopping, or getting over any obstacle that may present itself, and then continues his course, scrambling over everything, and varying his actions as much as possible; all his followers must strictly follow "the lead:" thus, if he jump over a ditch, they must clear it; if over a gate, they must do that also; and in everything *follow* or imitate him as closely as possible. If any player fail in performing the task, he must take his place behind all the rest, until some other player makes a blunder, and in his turn goes last.

## HIPPAS.

THIS pastime consists in one boy endeavouring to pull another from the shoulders of a third player, who carries him as on horseback: if he pull his opponent off, he takes his place. This game should not be played on rough or stony ground, but upon soft turf.



## WALK! MY LADY, WALK!

THIS game may be played by any number of boys, who all tie large knots in one corner of their pocket-handkerchiefs, and then toss up a halfpenny, to see who shall be "My Lady;" the loser is the one to whom the part falls, and he must be blindfolded and stand a little on one side, while the others go in succession to a spot marked on the ground, and jerk their handkerchiefs between their legs, as far behind them as they possibly can, and in whatever direction they please. When all the boys have done this, My Lady is conducted to the place marked on the ground, and desired to "Walk! my Lady, Walk!" which she or he rather, complies with

by advancing until he treads on one of the 'kerchiefs, when instantly the other players pick up their handkerchiefs and compel the unlucky owner of the one trodden upon by the Lady, to run the gauntlet of a good drubbing from the knotted end of theirs; after which he becomes the Lady, and the game continues as before.

#### THE SWING.

To a timber beam, or the stout limb of a tree, fasten two strong ropes of equal lengths, and at the ends of them tie a seat as firmly as possible. A player takes his place on the seat, and motion is then given to the swing by another player pulling a rope attached to the back of the seat. In putting up the swing, care should be taken that the ropes, and whatever they are fastened to, are strong enough, and that there is nothing in the way which might be the means of causing mischief to the swinger.

#### THE PULLEY.

FASTEN a pulley to a horizontal beam of wood, by a staple, or to the strong branch of a tree; pass a rope through it, and at each end of the rope tie a cross piece of wood; two boys must take firm hold of these pieces, one should lie down on his back, and let the other pull him up by sinking himself as he elevates his playmate; in his turn, he is raised in the same manner by his companion, and the sport is thus kept on, each rising and sinking alternately, somewhat after the fashion of see-saw.

#### SLIDING.

SLIDING on the ice appears to have been a favourite pastime among the youth of this country, many centuries since. It would be useless to insert any instructions for its practice; for a few falls on the ice will be far more impressive than all the lectures contained in the pages of drowsy instruction.

A kind of sledge, consisting of a circular seat, with a strong rope affixed to it, may be sometimes seen upon the ice; and the rider having seated himself, is drawn about by his companions, or whirled round with great velocity until he is unseated.

"JACK! JACK! SHOW A LIGHT!"

THIS game can only be played in the dusk of evening, when all the surrounding objects are nearly lost in the deepening gloom. The players divide into two parties, and toss up for innings, which being gained, the winners start off to hide themselves, or get so far away that the others cannot see them—the losers remaining at the "home." One of the hiding party is provided with a flint and

steel, which, as soon as they are all ready, he strikes, and the sparks guide the seekers in the direction they must take to capture the others ere they reach "home;" if they cannot touch more than two of the boys, the hiders resume their innings, and the game continues as before. It is usual, however, for the boys at the "home" to call out "Jack, Jack! show a light!" before the possessor of the flint and steel does so. When one party is captured, the flint and steel must be given up to the captors, that they may carry on the game.

#### I SPY I.

THIS game should also be played in the dusk of evening. There are two sides of equal numbers: those on one side stay at "home," whilst the others hide themselves, the last to do so calling out "Warning!" The side then leave "home" in search of those concealed, and whenever one is discovered, the finder loudly calls, "I spy I." If, however, previous to this discovery, two of the "out" side steal home without detection by their opponents, they may call in their hidden comrades by shouting "All home!" and then all the side may hide again. Should, however, the seekers *spy* two of the "outs," they may call the rest home, and then go and hide themselves.



# CRICKET.



"Flush'd with his rays, beneath the noontide sun  
In rival bands, between the wickets run;  
Drive o'er the sward the ball with active force,  
Or chase with nimble feet its rapid course."

BYRON.

"THE noble game of cricket," now the most popular of our athletic sports, appears to be comparatively of modern origin. The name can be traced no higher in our language than in the song "Of noble race was Shenkin," written by Thomas D'Urfey, about the year 1716, wherein Cricket is incidentally mentioned, thus:

"Hur was the prettiest fellow  
At foot-ball or at cricket."

The etymology of the name is, however, supposed to be traceable to the Saxon word *crick*, a stick. Strutt infers the game to have been formed on a slow and scientific improvement of the game of Club-ball, common in the reign of Edward III.: this was played by two persons, one holding the bat, and the other throw-

ing the ball to be struck by his opponent, and then endeavouring to catch it. Some few relics of this old game exist: one or two bats are preserved by the curious, and in shape resemble scimitars more than the bats now in use; and in two pictures of cricket, as played seventy or eighty years ago, may be seen the progress towards a scientific character, which the game had then made.

In some counties of England, cricket is almost universally played. The "men of Kent," and Hampshire, are celebrated cricketers; and Surrey and Sussex contain many good players. The Marylebone Cricket-Club, an association in London, numbers about three hundred members, including some of the junior branches of the nobility; and they possess a fine "ground," or meadow, on the verge of the Regent's Park.

Cricket is, perhaps, the most healthful of all the recreations enjoyed either by youth or manhood; and whether played by experienced hands and scientific rules, or by a few lads in a comparatively irregular manner, it is an admirable pastime.

#### BATS, BALLS, AND WICKETS.

CRICKET is played upon an open, well-shaved green, with Bats, Balls, and Wickets, by two parties or sides: one tries to bowl down the wicket from a settled distance, whilst the other attempts to strike off the ball with a bat. Boys should, of course, have balls and bats in proportion to their strength, and not according to the rules laid down by cricket-clubs, of grown persons; the wickets must also be proportionally smaller, else the ball will pass between the stumps, without bowling them down.

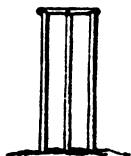
The bats are usually made of willow-wood, and are not more than thirty-eight inches in length, of which measure twenty-one inches are taken up by the pod; and the remainder being turned round, forms the handle. The pod must not be more than four inches wide, close to the handle, nor at the widest part, (near the tip,) more than four and a quarter; at the tip, it should be two inches thick, and from thence taper gradually towards the handle. The pod must be perfectly smooth on the surface, swelling towards the middle, and neatly rounded off at the tip. The handle is sometimes strengthened by a piece of lance-wood being let into it, and continued for about four inches down the pod; twine is wound tightly and regularly once all over the handle, by which means it is strengthened, and a firmer grasp is obtained than could otherwise be taken.

The ball must not be more than nine inches in circumference, nor more than five and a half ounces in weight; at the beginning of each inning, either party may call for a new ball; but in a match, the same ball must be used throughout.

The stumps form the wickets, and three are required to each

wicket. They are usually made of lance-wood, twenty-eight inches in length, and pointed at one end to the length of an inch. When pitching the wickets, the stumps must not be driven more than an inch into the earth, as by the rules they should be twenty-seven inches above ground; and unless they fall down easily, when touched by the ball, they will probably break; the tops of the stumps must be grooved or hollowed out crosswise, to about the eighth of an inch in depth, so as to receive the balls.

The balls, of which there should be two to each wicket, must each be four inches long, and one end must be made to fit the grooves in the stumps; in pitching the wickets, these ends should be put in the grooves, and the other ends allowed to rest on the centre stump, as shown in the illustration. Some persons use one ball only, of eight inches in length; but it will not always drop off so readily as two balls. The wickets should be pitched opposite each other, and at twenty-two yards' distance. With the consent



of both parties, the wickets may be changed after rain.

In a line with the stumps, should be made a mark, called the *bowling-crease*; it should be six feet eight inches in length, with the stumps in the centre. There should also be another line called the *return-crease*, at each end, at right angles, towards the bowler.

Another mark, called the *popping-crease*, should be parallel with, and four feet four inches from, the wicket; unlimited in length, but not shorter than the *bowling-crease*. In the centre of the *popping-crease*, and opposite the middle stump, should be the *blocking-hole*. It is not lawful for either party during a match, without the consent of the others, to alter the ground by rolling, beating, mowing, watering, or covering: this rule, however, will not prevent the striker from beating the ground, near where he stands, with his bat, during his inning; nor the bowler from filling up holes with sawdust, &c., when the ground is wet.

#### SINGLE WICKET.

Two persons can play at single wicket, one being bowler, the other striker; they should toss up for first inning, and the bowler should pitch the wickets, whilst the striker measures off the distance for the bowling-stump, which both must agree to beforehand. Next, measure on the ground a bat's length from the middle stump to the bowling-stump, and there mark the *popping-crease*. Place the bat upright on this mark, ask the bowler if the bat be properly before the centre of the wicket, and then make another mark on the ground, to be called the *blocking-hole*. The bowler must now begin to play, and the proper directions for his move-



ments will be found in a subsequent page, under the head of "Bowler." The striker should endeavour to hit any ball which comes within his range, taking care to keep his left shoulder forward, and to stand firmly on his right foot; he should notice how the ball pitches, so that he may guess how far it is likely to rise, and judge whether it is worth while to hit it hard, and get a run; or whether, by blocking it off, he may disappoint his opponent, and so make the game his own. When blocking, never allow the tip of the bat to come before the handle; as, in that case, the ball will rise into the air, and perhaps enable the bowler to catch it. In striking, keep the bat as nearly perpendicular as possible, by doing which, more of the wicket is covered than when the bat leans either to the right or left. Further directions for the "Striker" will be found under that head in another page. The striker should return the ball up to the bowler, after it has passed the wicket; but the bowler in this case must not put down the wicket when the striker is off his ground, unless he runs himself out. The striker, in running, must touch the bowling-stump either with his hat or person, or it is no run.

When three play, they must toss up for innings: the last player must pitch the wicket, and bowl: and the second, after placing the bowling-stump, take the part of a fieldsman, and place himself on the left hand of the bowler, about three times his distance from the wicket; the first player is striker, and should mark the *popping-crease*; if the striker hit the ball nearer the fieldsman than the bowler, or so wide away that the latter would have some distance to run, the former should pick it up or catch it, and return it to the bowler. When the striker runs, the bowler should instantly run to the wicket, and the fieldsman should throw the ball to him, so that he may catch it: this plan being much better than running to the wicket with the ball, as it can be thrown with greater celerity than a player can run; and the

striker may run before, but not after, the ball has been thrown in before the bowling-stump. When the first striker is out, the fieldsman should take his place, the bowler become fieldsman, and so on; until each one has had his inning, bowled, and been out in the field.

If there be four players, the first should be striker, the second take the field, the third stand behind the wicket, and the fourth bowl: when the striker runs off his ground, if the wicket-keeper has the ball in his hands, he should put down the wicket; but he must not touch the ball until it has passed the wicket. The necessary instructions for this player will be found under the head of "Wicket-keeper." The bowler should not run to the wicket, when the striker attempts to run, but must throw the ball up to the wicket-keeper, and the fieldsman should do the same. When five, or even more play, the additional players must take the field.

If any person wish to join the game whilst it is going on, he must take his post in the field, and continue there till the last striker is out, when he takes his inning. If no wicket-keeper was appointed at the beginning of the game, there must be no stumping-out, although a fieldsman may be directed to take the above place. If there be less than six players, the striker cannot run when the ball is struck behind the wicket.

Single wicket may be played in two different ways. First, when less than five players on a side are engaged, the striker cannot be stumped out; if he move off his ground whilst striking the ball, it is no hit, and he must not run. All the hits should be before the wicket, and to ascertain whether they be so, two stumps must be placed, one on each side of the wicket, parallel with, and twenty-two yards from it; should the ball, when hit, pass behind either of these stumps, before reaching them, the umpire should call out "behind wicket," or "no run," and no run is allowed; but if the ball go as far as the stump, and then run behind the line of the wicket, the fieldsman must pick it up, and keeping outside the stump, run until he is in front of the line, and then throw it in; if he act contrary to this rule, the umpire must order the ball to be carried back, behind the wickets, until beyond the stump, and there to be thrown in, the striker running in the mean time.

The other method of playing single wicket is called "All hits," and is played only when there are five or more on each side: the striker may then be stumped out, may leave his ground to strike, and the wicket need not be touched, except in front, to put him out; all hits before or behind wicket, bye-balls, &c., tell when run for. The runs in this game are only fifteen yards long; the bowling-stump should be twenty-two yards from the wicket, and at about the distance of a yard out of the line of bowling; and



at fifteen yards from the wicket should be placed a mark, on or over which, the striker must put his bat or person, before it can be considered a run.

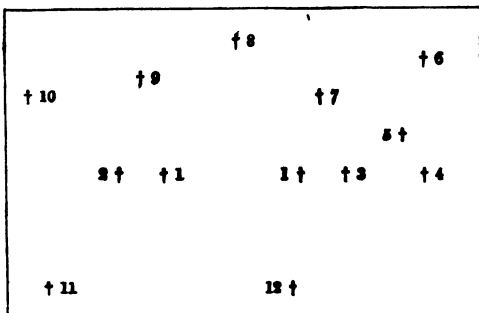
#### LAWS FOR SINGLE WICKET.

WHEN the striker hits the ball, one foot must be on the ground behind the popping-crease; otherwise, it will be no hit. When there are less than five players on each side, neither byes nor over-throws are allowed; neither can the striker be caught out behind wicket, or stumped out. The fieldsmen must return the ball, so that it crosses the play between the wicket and bowling-stump, and the striker may run till it is so returned. When the striker has made one run, he must touch the bowling-stump and turn before the ball crosses the play, to entitle him to another run; he may reckon three runs for a "lost ball," and the same number for a ball stopped by a bat. When there are only four on each side, there should be no bounds; and all hits, byes, and over-throws should be then allowed. The bowler is subject to the same laws as in double wicket; and not more than a minute should be allowed between each ball.

#### DOUBLE WICKET.

HAVING described the mode of playing single wicket, we proceed to give the laws for double wicket, as arranged by the members of the Marylebone Club. Double wicket is played by eleven persons on each side, two umpires, and two scorers to score the runs; thirteen play at one time, viz. two strikers, one bowler, wicket-keeper, long-stop, short-slip, long-slip, point, cover, middle-wicket, long-field off-side, long-field on-side, and leg. The two strikers are the in-side: and the object of the game is to obtain the greatest number of runs: a run may be got not only when the ball is hit, but also when it is bowled beyond long-stop, or when it is thrown violently across the play: in the former case, it is termed a bye-ball, and in the latter an over-throw; both byes and over-throws are scored to the in-side, and not to the strikers. When one striker is out, another of the in-side supplies his place; and it is so continued until all their side have had one inning, the two last players being both out together. When both sides have been in once, and out once, the first inning is played; indeed, the game might then be considered complete, but in most matches, another inning is played. The runs are scored to each striker separately, for each inning; byes, over-throws, no balls, and wide balls to each side; and the side which at the termination of both innings scores the greatest number of runs, wins the game.

A list of the *Players*, and their respective stations and duties, follow:—



- |                          |                         |                   |
|--------------------------|-------------------------|-------------------|
| 1. 1. Strikers.          | 2. Bowler.              | 3. Wicket-keeper. |
| 4. Long stop.            | 5. Short-slip.          | 6. Long-slip.     |
| 7. Point.                | 8. Cover.               | 9. Middle-wicket. |
| 10. Long-field off-side. | 11. Long-field on-side. | 12. Leg.          |

#### THE STRIKER, OR BATSMAN.

THE striker should place his right foot firmly on the ground, just so near the popping-crease as to be in his ground and as near the blocking-hole as possible, yet so as not to stand before his wicket; his left foot he may place as wide as he pleases towards the bowler; he should keep his left shoulder forward, which will prevent the tip of the bat swinging too far in blocking, and the ball rising too much. The bat must be held nearly upright, and opposite the middle stump, so as to cover it as much as possible. The method of hitting upright should be much practised, as it prevents the ball from being caught: for this purpose, the handle of the bat should be held toward the bowler, neither to the right nor left; and the surface presented to the opposite wicket, but at the same time to the ground. If the ball pitch more than four and a half yards before the striker, he should step his left foot forward without moving his right, and play the bat upright at some distance from the popping-crease. If nearer, the play should be back; this rule applies to twisting, as well as straight bowling, and for hitting and stopping. In forward play, the bat can seldom be safely played above four feet from the pitch of the ball; in back play, greater celerity is required, and immediately on the delivery of the ball, the bat's point should be thrown toward the top of the wicket, by the turn of the wrist; thus the bat will meet, rather than follow, the ball, which will be accordingly propelled further. In hitting, keep the hands nearly

close together, but free, so that one does not check the other; then, exerting the arms, wrists, and shoulders, strike the ball smartly, five or seven inches from the tip of the bat, when the shock will be scarcely felt. If the ball come straight to the wicket, the striker should hit it straight back, or, at all events, not wider than to long-field; play the bat upright, and hit the ball on the top, unless it come so that you can be sure of sending it beyond the fieldsman. When a ball comes wide of the off-stump, learners are apt to let the ball rise by touching the off-edge of the bat; but this may be prevented by keeping the shoulder well over the point of the bat. When balls come five or six inches wide, the learner should cross his left leg over without moving his right; by which means he may hit all that are not bowled wide. In forward play, he should hit straight back or nearly so; as the smaller the angle he makes in striking the ball, the less likely is he to miss it. Stepping in to strike is not recommended, as no rule can be applied to it. Over-pitched balls that come just within the popping-crease should be met; else, if they shoot, they are sure to hit the wicket. In running, the striker should keep the bat on the outside of his partner, and be careful not to run against him; and he should be very attentive to his own, and his partner's hits. The striker at the bowler's wicket ought to stand within the popping-crease, or the bowler may put him out; he may run when the ball is delivered, yet not so far but that he can readily return to save his wicket, in case there be no run. The strikers should run rapidly the first time, as by so doing they may get a second run; but they had better lose a run than endanger their wickets.

#### THE BOWLER.

BOWLING requires great steadiness, and is a very important part of the game. Deliver the ball with one foot on, and the other behind, the bowling-crease. In general, the ball should be pitched about three yards and a half from the wicket for slow, four yards for middle, and five yards for quick, bowling; varying, of course, according to the play of the strikers. Hold the ball firmly with the seam across, or so that the tips of the fingers touch; but hold it only with such a grasp as may be sufficient to steady it, for by a turn, even of the wrist, it may be made to prove unsteadily: it should neither be jerked, nor thrown, but be bowled fairly. In taking the run before delivering the ball, the bowler must start gently at first, increasing his pace as he nears the bowling-crease; and he should deliver the ball with his hand as low as possible. The bowler may make the ball twist after leaving his hand, by holding the back of his hand to the ground, and bringing the thumb under, at the moment of

delivery. Begin with slow bowling, as strikers are very cautious at first; and in order to perplex them, bowl unexpectedly fast or slow, twisting or straight; and it will confuse the striker still more if the same position be invariably maintained when delivering the ball. Aim always at the middle stump, for a ball directed to the leg is frequently struck to a great distance. The bowler may require the striker at his wicket to stand on which side he pleases; and the moment after delivering the ball, he should return to his wicket, to be ready to receive the ball from the fieldsman. It is sometimes advisable to change the bowler for a short time, as the striker gets used to one person's method. Every fresh bowler must bowl a complete "over," which is sometimes more than four balls. In practising bowling, use one particular attitude and distance of run in delivering the ball; as, even a little variation from the usual distance, alters the bowling materially.

#### THE WICKET-KEEPER

SHOULD see that the rest of the fieldsmen are in their proper places; his directions should be given by signals, as calling out would cause confusion. When the striker moves off his ground after hitting the ball, the wicket-keeper should try to knock down the wicket, which is called "stumping out." He should stand most conveniently to catch the ball when thrown in; and if the striker has not reached his ground, he should knock down his wicket as quickly as possible; he must return the ball to the bowler, so that it will reach his hand, for the latter should not have to run or stoop for it.

#### LONG-STOP

MUST stand twelve yards behind the wicket, to throw up the ball when it has passed the wicket-keeper; he should be active, and able to throw in well, as the greatest number of balls will come to him. He will have also to field the balls that tip the edge of the bat, both off and on; and to back up when the ball is thrown in from long-field.

#### SHORT-SLIP

SHOULD stand next the wicket-keeper, rather behind the wicket on the off-side, so as to reach about a yard from it; he must be very quick, as the ball will fly from the bat rapidly to him. When the ball is thrown in, he should stand behind the wicket-keeper to prevent overthrows; this is called "backing up," and if the wicket-keeper leave his place to go after the ball, then short-slip must take it. It is sometimes necessary to have a second short-slip, who should be placed midway between short-slip and point.

## LONG-SLIP

**MUST** stand about twelve yards from the wicket, in a line with the striker, so as to cover both short-slip and point; he must also be careful in backing up, and be on the alert to catch the ball, for should it pass him, there will be a run for it.

## POINT

**SHOULD** stand about seven yards from the wicket, in a line with, but rather before, the popping-crease. If the striker hit hard, it will be as well to draw back a little. In backing up, point must give the man at slip enough room. Point should be very quick and active, and be able to catch well; as many strikers, from not playing the bat upright, hit all off-balls towards him.

## COVER.

**THIS** person's place is in a direction between point and middle wicket, at a distance so as to cover point. When the strikers hit very much to the on-side, cover should be placed there as a middle-wicket.

## MIDDLE-WICKET

**SHOULD** stand fourteen yards from, but in a line with, the bowler's wicket. This being an important post, it must be kept well; if the bowler leave the wicket to field the ball, middle-wicket must take his place. When throwing in, the fieldsman should try to throw the ball home at about the height of the wicket, and not harder than necessary.

## LONG-FIELD, OFF-SIDE,

**MUST** stand at a considerable distance in the field between the bowler and the middle-wicket-man, so as to cover them. He should be able to throw the ball up well, and, if possible, home to the wicket-keeper. As the ball is frequently hit to a very great distance, it is as well to have a second person to throw it to the wicket-keeper, and long-field should throw it so that he may catch it.

## LONG-FIELD, ON-SIDE,

**MUST** also stand at some distance in the field, and considerably wide of the bowler's wicket. If a middle-wicket-man be placed on this side, the fieldsmen must vary their places, to suit the play, as circumstances require.

## LEG

SHOULD stand about even with, or rather behind, the wicket, and at sixteen yards from it. He must back up balls from the off side, in every direction.

## CATCHING OR STOPPING.

STEP well to the ball in catching, and receive it easily, by yielding to rather than opposing it. Stop the ball, by meeting it full; if it be coming swiftly, put down the hands as quickly; if with a bound, wait, step in, or draw back, as may be necessary. Throw up the ball to that wicket from which the striker is furthest, at about the height of the bail, so that the wicket-keeper may catch it easily. It is a great loss of time to run with the ball in the hand.

## LAWS FOR DOUBLE WICKET.

THE bowler shall bowl four balls before he changes wickets, which he can only do once in the same inning; if in delivering the ball, his hand be above his shoulder, the umpire must call "no ball," and this is not reckoned one of the four. If he toss the ball over the head of the striker, or so wide that it cannot be played at, the umpire, (although the striker attempts to hit it,) shall allow one run to the in-party, which shall be put down to the score of wide balls, not to be reckoned as any of the four balls. When the umpire calls "wide ball," one run only is reckoned, and the ball is considered dead. If the bowler deliver a "no-ball," the striker may play at it, and get as many runs as he can, and shall not be put out except by running out; if no run be obtained by any other means, then one run must be scored; in the event of a change of bowlers, two balls only can be allowed for practice. If a bowler bowl one ball, he shall be compelled to bowl four.

The striker is out, if the bails be bowled off; or, if a stump be bowled out of the ground; or, if when striking, or at any time when the ball is in play, both his feet be over the poppingcrease, and his wicket put down, except his hat be grounded within it; or if, when striking, he hit down his wicket; or if, under pretence of running, or otherwise, either of the strikers prevents a ball being caught, the striker of such ball is out; or if any part of the striker's dress knock down the wicket; or if he touch or take up the ball while in play, unless at the request of the opposite party; or if, with any part of his person, he stop a ball which in the opinion of the umpire at the bowling-wicket would have gone straight to the striker's wicket, and hit it. If the players have crossed each other, he that runs for the wicket,

which is put down, is out. When a ball is caught, no run is reckoned. When a "lost ball" is called, the striker is allowed six runs; but if he can run more than that number, before "lost ball" is called, he may count all which have been run. After the ball is in the wicket-keeper's or bowler's hand, it shall be reckoned dead; if when the bowler be about to deliver the ball, the striker at his wicket goes outside the popping-crease, the bowler may put him out. If the striker be hurt, he may retire from his wicket, and return at any time during that inning; or some other person may stand out for him, but not go in. No substitute shall be permitted to bowl, keep wicket, stand at, or cover, the point; or stop behind, in any case. If a fieldman stop a ball with his hat, it shall be reckoned dead, and the opposite party may add five to their score; if any runs shall have been taken, they shall be five in all. When the ball has been hit, the striker may guard his wicket with his bat or any part of his body, except his hand.

The wicket-keeper must not take the ball for the purpose of stumping-out, until it has passed the wicket; if any part of his person be over or before the wicket, should the ball hit it, the striker shall not be out.

The Umpires must stand at six yards from the wickets: all disputes are settled by them, each at his own wicket; but in case of a catch, which the umpire at the wicket bowled from, cannot see well enough to decide, the opinion of the other umpire shall be conclusive. The umpires shall pitch fair wickets, and the parties toss for innings. They must allow two minutes for the strikers to come in, and fifteen minutes between each inning. When the umpire calls "play," the party refusing loses the match. The umpires are not to order a striker out, unless appealed to by the opposite players. If one of the bowler's feet be not entirely behind the bowling-crease, within the return-crease, when he delivers the ball, the umpire must (unasked) call "no ball." If, in running, either of the strikers fail to ground his bat, (in hand,) over the popping-crease, the umpire shall deduct two runs for every such failure; because the striker not having run home in the first instance, cannot have started in the second from the proper place. No umpire may bet, nor can he be changed during a match, unless both parties consent; except in case he has broken the previous law, about betting, when either party may dismiss him. When four balls have been delivered the umpire must call "over," but not until it is in the wicket-keeper, or bowler's hand; it shall then be considered dead. The umpire must call "no ball" instantly upon delivery; "wide ball," as soon as it passes the striker.

---

## GYMNASTICS.



A GYMNASTIC GROUND.

**GYMNASTICS** take their origin from the athletic games of ancient Greece. During the best periods of her history, all the youth were regularly trained to these exercises, as a branch of education. In every town, there was a gymnasium or school, supported at the public charge, and furnished with baths, courts, race-grounds, and every other convenience. To these seminaries, the youth repaired at a very early period; for we find, that even in the great games, at which all Greece appeared, boys of twelve years of age obtained prizes. Gymnastics were likewise numbered among the celebrated Olympic games, which sustained and fed the desire of glory that animated all classes of the ancient Greeks.

In modern times, the Germans, Danes, and Swiss have excelled in Gymnastics. Under this general name, indeed, is included every vigorous exertion of the limbs, such as Balancing, Climbing, Leaping, Running, Vaulting, and Walking. The use of gymnastic exercises is to unfold and strengthen the muscular system, by teaching the proper means of employing it to the utmost possible advantage; and the great utility of such recreations will be doubted only by those who are not aware that the



health of the body depends upon the full and just exercise of the different members of it. A modern and able writer on this subject, after pointing out the importance of physical exertion, says, that "Exercises, moreover, inspire confidence in difficult situations, and suggest resources in danger. This consequent influence on the moral conduct of a man is such, that by a confidence which is well founded, because it springs from a perfect knowledge of his own powers, he is often enabled to render the most important services to others." When practising the exercises, it is extremely necessary to guard against performing any one of them in particular, to the exclusion of the others; as, by so doing, the muscles most called into action will become very much developed, whilst those not exercised will remain weak; and that symmetry and elegance of form which well-regulated active exertion tends so much to improve, must consequently be destroyed. The movements should, therefore, be varied as much as possible; when it will be found that a few hours' practice daily, sometimes at one, sometimes at another, kind of exercise, will be sufficient, both for the health of the youthful gymnast, and the graceful display of his muscular system.

#### GENERAL DIRECTIONS.

THE best time for practising gymnastic exercises is either early in the morning, or in the cool of the evening; but never immediately after meals.

The pupils should not be permitted to carry knives, peg-tops, or any other toys in their pockets; neither ought they to be allowed, while warm after practising, to lie down on the ground, continue without their jackets or coats, sit in a draught, drink cold water, or wash themselves with it; carelessness on these points frequently causing severe illness.

A master or usher should superintend the sports, to keep the pupils from attempting feats beyond such as their strength or practice will enable them to perform with ease and safety. It is a good plan to divide the pupils into classes, according to their size and strength; and they should be made proficient in one exercise before they are allowed to practise another.

The left hand and arm being generally somewhat weaker than the right, the former should be gradually exercised until both become equally strong.

In all gymnastic performances, the pupil should rather endeavour to strengthen the body, by exercises taken with moderation; than to exhaust and weaken it, by violent and unnecessary displays of force and agility.

The exercises should always be begun and finished gently; abrupt transitions being very dangerous.

## WALKING.

IN walking, the head and body should be carried upright, yet perfectly free and easy, the breast projected, stomach held in, and the shoulders back; and the arms should be allowed to move with freedom by the sides. The knees should be straight, and the toes turned out, but not to an excess; for then they look equally as awkward and ungainly as when they are turned in. In the slow walk or march, the foot should be advanced, keeping the knee and instep straight, and the toe pointing downward; it should then be placed softly on the ground, without jerking the body; and this movement should be repeated with the left foot, and the action continued until it can be performed with ease and elegance. The moderate pace differs from the march in one or two particulars: thus, the ball of the foot, instead of the toe, must first touch the ground, and the toes should not be so much turned out as in the slow walk. In the quick step, the body should be thrown more forward than in the other steps, the toes less pointed out, and the knees allowed to be slightly bent and springy; the head, however, must still be kept erect. All these steps should be practised until they can be executed with grace and precision.

"In a graceful human step," observes a popular writer, "the heel is always raised before the foot is lifted from the ground, as if the foot were part of a wheel rolling forward; and the weight of the body supported by the muscles of the calf of the leg, ~~rests~~ for the time on the fore part of the foot and toes. There is then a bending of the foot in a certain degree."

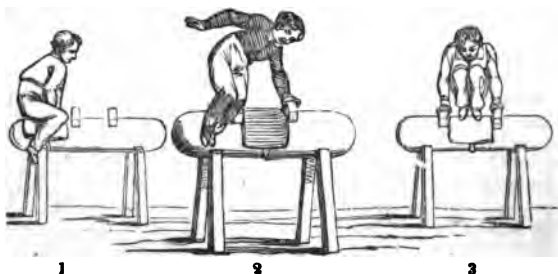
## RUNNING.

IN running, the body should be inclined forward, the head be thrown somewhat back, and the respiration restrained; the upper part of the arms must be kept close to the sides, with the elbows bent; and they should not be swung about, but moved as rarely as possible, in order that no opposition may be given to the free movement of the body by the fluttering of the clothes. As the pupil advances in proficiency, he may try to run long distances in a given period of time; and he will find running in a circle an exceedingly good practice, if he vary the direction so as to work both sides equally. The pupil should be learnt to make his inspirations as long, and his expirations as slow, as possible, long wind being of the utmost consequence to a good runner; but he must invariably cease running the moment his breath becomes short and painful, and perspiration takes place. It is highly injurious to run immediately after meals. A mile in five minutes is reckoned good speed, although it has been achieved in four

minutes and a half; and to run four miles in twenty minutes, is considered a feat that the best runner would be most happy to accomplish.

#### THE LONG LEAP.

For this exercise, it is usual to have a trench dug in the ground, widening gradually from one end to the other; but it is not essentially necessary to incur such an expense, as two lines marked on the ground, some distance apart from each other, will equally answer the purpose. The gymnasts must try to leap over this trench, following each other in quick succession, taking the wider part as their practice renders them more expert and capable of clearing it. In leaping without a run, the body should be inclined rather forward, the feet close together, and the spring taken from the balls of the toes; the hands and arms should be thrown forward, and as the leaper descends, his body should still be slightly inclined. In performing the long leap with the run, the latter should be from ten to twenty paces, and made in small quick steps; the spring should be taken from one foot, to be drawn rapidly up to the other, so that the leaper descends upon both feet; the body must be bent, and the arms should be thrown forward towards the spot which the leaper purposes to reach. On level ground, a distance of twenty feet is considered an excellent leap, and twenty-one is very rarely achieved.



#### VAULTING.

The vaulting-horse is a cylinder of wood, rounded off at both ends, and firmly supported on four stout legs. Two ridges of wood are fixed towards the centre of the back, leaving sufficient space between them for an ordinary-sized person to sit; this

space is called the saddle, and the shape of the horse and its saddle will be best understood by referring to the above representations; leathern pads, well wadded with wool, should be buckled on the horse at any part on which the exercises are intended to be performed. In fig. 1, the manner of leaping on the horse is shown to be by placing the hands upon the top, and springing lightly on it. In vaulting into the saddle, the hands must be placed upon one of the ridges, a spring taken at the same instant, and the body turned on one side; so that only one leg passes over the horse, and the performer then descends into the saddle in the proper position: this exercise may be performed either with or without a run. Fig. 2, shows the position in side vaulting; in which the hands are placed on the ridges, and at the moment the spring is made, and the feet are thrown over the horse, one hand lets go its hold, as in the illustration, and the gymnast alights upon his toes on the other side of the horse: this should be practised from both sides. Fig. 3, represents vaulting on or over the saddle, in performing which, the hands are placed on each ridge, and the spring is taken between them; when the body may either rest in the saddle or go over it.

#### THE HIGH LEAP.



THE leaping-stand is formed of two upright posts, with holes bored through them, about one inch apart, and in which two moveable pegs—as shown in the annexed illustration—may be placed at any height required; weights are placed on the feet of these posts, to keep them from falling, and over the projecting ends of the pegs a line is laid, having a sand-bag attached to its ends, in order to keep it straight; the leap being always taken from the side of the stand towards which the

heads of the pegs are turned, if the gymnast's feet should happen to touch the cord, it is of course pushed off and falls immediately. The high leap should be practised, first standing, and then with a short run; in the standing leap, the feet must be kept close together, and in the leap with a run,—which ought not to exceed ten paces,—as directed for the long leap. In all these leaps, the performer should alight on the balls of his feet, so as to deaden

the shock and descent, which, if not thus broken, might occasion injury.

#### THE DEEP LEAP.

In practising the deep leap, the body must be bent, and the hands placed in front of the feet, so that they touch the ground before the latter; or this leap may be made without the hands. This exercise is likely to affect the brain if the descent be made on the heels instead of the balls of the toes—an affect only to be prevented by constantly practising progressive exercises, from three or four, to twelve feet: for this purpose, a flight of steps is the best adapted; the pupil ascending a certain number, jumping from the side, and increasing the number of steps, or height, as he attains proficiency.

#### CLIMBING THE UPRIGHT AND SLANT POLES.

The upright pole may be two inches and a half in diameter, the slant pole about three inches, and both of them perfectly round and smooth. The climber should take hold of the pole with both hands, as high as he can possibly reach, and raise himself by drawing up his legs; he should then hold very fast on with the latter, and move his hands higher; again draw up his legs, and thus continue ascending, moving his arms and legs alternately. When descending, he should slightly loosen the grasp of his legs, and take his hands from the pole, yet hold them in a guarded manner on each side.

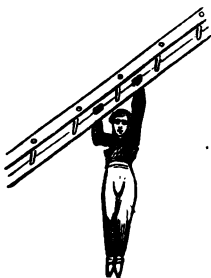
#### CLIMBING THE ROPE.



To climb the rope, cross the feet and hold the rope firmly between them; move the hands one above the other, alternately, and draw the feet up between each movement of the hands. In the sailor's manner of climbing, the rope from the hands passes between the thighs, and twists round one leg, just below the knee, and over the instep,—as shown in the annexed figure—the other foot then presses upon the rope, and thus an extremely firm support is obtained.

The slant rope is best climbed by placing the sole of one foot flat on the rope, and the other leg across its instep. In descending the rope, the pupil should not slide down, but lower the hands alternately; else they may be injured by the friction.

## CLIMBING THE WOODEN LADDER.



THE learner should seize each side of the ladder, and by moving his hands alternately, ascend as far as his strength will permit. He should next try to climb the ladder by the rungs, by bringing the elbow of his lower arm firmly down to the ribs previous to pulling himself up by the other. He may, when perfect in this exercise, try to ascend by seizing one side of the ladder by its outer and upper part, with both hands, and moving them alternately upward. In these three exercises, the legs must be kept close, and as straight and steady as possible.

## CLIMBING THE ROPE LADDER.

THE rope ladder should have several rungs to keep it spread out, and prevent its getting twisted. The great point to be overcome in climbing this kind of ladder, is, the method of keeping the body stretched out and perfectly upright; for, from the flexibility of the rope sides of the ladder, its steps, as it hangs, are very easily pushed forward, and the climber is consequently thrown into a slanting position, with his weight upon his hands; the necessary straightening of the body can only be attained by steady and careful practice.

## THE INCLINED BOARD.

THE inclined board should be two feet wide, about two inches thick, and rather rough on the upper surface. The pupil must take hold of both sides of the plank with his hands, and placing his feet flat in the middle, ascend by moving his hands and feet alternately. The board may make an angle of about thirty degrees with the ground, during the first attempts; but when the gymnast has, through practice, acquired power and precision in his movements, the plank may be raised until it is almost perpendicular. When the board is thus slightly, or not at all, inclined, the body should

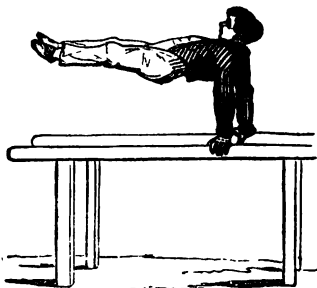


be curved inward, and the legs raised up, so that the highest leg is nearly even with the hand. In descending, small and quick movements should be made both with the hands and feet. It is not requisite that the young beginner should climb to the upper part of the board at the first attempt, but stop about half way.

#### THE PARALLEL BARS.



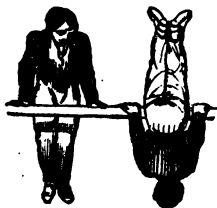
FIRST, raise the body by the hands, as shown in the illustration; then pass from one end of the bars to the other, by alternately moving the hands, and next practise the same motions backward. Afterward, endeavour to pass along, by moving both hands at once, and keeping the legs close and straight. In performing the swing on the bars, support the body on the arms, and swing from the shoulders, allowing the feet to rise equally high before and behind, as in the annexed representation: at the third swing, throw the body over the bar, either to the right or left, loosening hold of the opposite bar at the same instant; and this must also be practised backwards.



To lower the body by bending the elbows gradually, let yourself down until the elbows are level with the head; at the same time draw up the feet towards the hams, but without allowing the knees to touch the ground; then straighten the arms, and regain the original upright position on the bars. Another exercise may be performed thus: when the

pupil is in the position represented in the first figure, the right elbow should be lowered to the bar, and after that the left; the right arm should then be lifted up, next the left, and the first position resumed.

## THE HORIZONTAL BAR.



In the exercises on the horizontal bar, the first position is assumed by taking hold, with both hands, of the side of the bar towards you, and raising yourself until you can look over it. When you can perform this easily, place the hands on the further side of the bar, and raise yourself as before. In the next exercise, place your hands on each side of the bar, then raise the body off the ground, and endeavour to pass from one end of the bar to the other, by making a succession of small springs of the hands; and afterwards by passing the hands alternately; the legs being, in the mean time, kept close and as straight as possible. Another movement consists in lifting up the legs above the bar, and then allowing them to drop again into the perpendicular position; and when the pupil can swing thus by holding on with his hands and feet, he should try to pass along the bar by moving one hand and one foot alternately; if he cannot achieve this, he may slide his feet along the bar, and only move his hands alternately. Next, practise hanging by the right arm and right leg, whilst the left hangs down; and by the right arm and left leg, and left arm and right leg. When perfect in these exercises, take hold of the bar firmly by the right hand, throw the right leg over the bar, hold on steadily by the joint of the knee, and next raise the body and get the left arm-pit over the bar: then, by a little exertion, you will be enabled to assume a riding position on it. By firmly holding with the hands, while you bring one leg over the bar, you will be in the position shown in the first figure. Swinging round the bar with the head downward, is performed by taking hold of the bar with both hands, swinging the feet backward and forward two or three times, and then throwing them up in front; by which movement the head sinks down backwards, as represented in the second figure. Or, take hold of the bar with the hands, swing round, and while doing so, pass the feet between the hands, returning them the same way, or dropping on the toes to the ground.

## THE BALANCING BAR.

FOREMOST among the preliminary exercises of balancing are the following: standing on one leg, holding one foot high in the hand, kissing the toe, and sitting down. The two first explain



themselves sufficiently; to kiss the toe, lift one foot with both hands, and raise it toward the chin, which should be slightly lowered to meet it. In sitting down, both arms and one leg should be thrust forward, and the other leg bent until the pupil can sit down, as shown in the annexed figure; after which he should carefully rise up, keeping his arms and leg outstretched, and steadily preserving his balance all the time. The balancing bar is a long, round pole of wood, about fourteen inches thick at one end, and tapering gradually towards the other, where it is not more than half that diameter. It is sup-



ported only at the thickest end and in the middle, from whence to the thinner end it is extremely difficult to perform the exercises, as the pole yields at each step. In dry weather, the soles of the shoes should be damped, as then the upper surface of the bar is smooth and slippery. Mount the bar either from the ground, or from a riding position on the bar; in the latter case, place the right foot flat on the bar, keeping the

heel close to the upper part of the thigh, and allow the left foot and leg to hang perpendicularly down, with the toes pointing to the ground; and then stretch both arms forward, as in the illustration, fig. 1; next gradually rise on the foot, and keep your balance



2

1

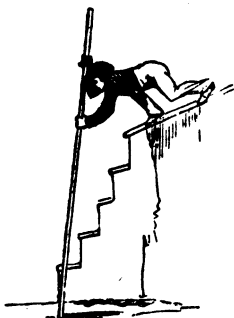
for a minute or two before you attempt to walk along the bar. First, try to walk, with assistance, then alone, balancing by extending the arms, and afterward with the arms folded behind. When you can walk steadily and easily, endeavour to turn round on the bar, first trying at the broad, and then at the narrow end; and lastly walk backward. When two persons, in walking on the bar, wish to pass each other, they should join arms, place

their right feet forward, and turn quite round, by each stepping with the left foot round the right of the other, as represented in fig. 2. All the balancing exercises require great care.

#### THE HIGH LEAP WITH THE POLE.

THE pole should be from seven to ten feet in length, and made of perfectly sound fir; if it make the least crackling noise while the leaper is practising, it is unsound, and should be immediately laid aside. Grasp the pole at about the height of the head, with the right hand, and with the left, at about the height of the hips; then place the end of the pole to the ground, spring forward at the same instant, and swing round, so that you alight facing the spot you leaped from. When confidence has been attained through practice, the pupil may try to clear over the leaping-stand, such as is used in the high leap, already described. In the early exercises over this stand, you may quit the pole, by giving a slight push with one hand, so that it may fall on the inner side of the cord; and, try to carry the pole over the cord, which is an exceedingly difficult feat to perform, for you must gradually elevate the pole as you descend, so that when you alight, the end of the pole may be upward. These exercises should be practised with a short run; and unless you plant the end of the pole on the ground, at the very moment that you take the spring, the leap cannot be considered perfect.

#### THE LONG LEAP WITH THE POLE.



This leap requires strength in the hands and arms, and some knowledge of balancing: it is best practised from a flight of steps. The leaper should take the pole in the usual way, and allow his hands to slide down it until the whole weight of his body rests upon the pole, as shown in the illustration: he should then quit the height with his feet, and swinging round the pole, descend on the balls of his toes, with his face toward the place he sprung from. This leap ought never to be practised immediately after meals.

#### THE LONG LEAP WITH THE POLE.

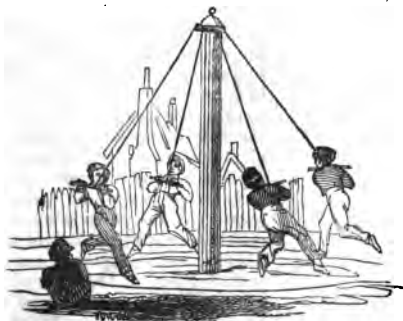
Is performed like the preceding, as regards taking the spring

and handling the pole. Formerly, in hawking in the woods and coverts, the sportsman carried a stout pole, to assist him in leaping over rivulets. Henry VIII., whilst one day pursuing his hawk on foot, in Hertfordshire, was plunged into a deep slough, by the breaking of his pole.

#### WALKING ON STILTS.

WALKING on stilts is a very good exercise in balancing, and may be practised by the pupil when he is expert on the balancing bar. Stilts are easily made: the poles must be about six feet in length; and at or near two feet from one end, pieces of wood shaped like brackets, should be fastened to them; two or three inches above the brackets, and likewise near the top of the stilts, leather straps with buckles attached must be securely nailed on. To mount these long legs, the balancer must place his feet on the brackets, and buckle the straps closely below his knees, and just above his ancles; so as to confine the upper parts of the stilts to his legs, and keep his feet firm on their resting-places. The long strides which an active youth can take with these additional supports, will enable him to keep pace with a four-horsed stage-coach with comparatively little fatigue.

#### THE FLYING STEPS, OR GIANT STRIDES.



For this exercise there should be fixed in the ground firmly a stout mast or upright beam of wood, on the top of which is an iron cap that moves round with facility in a horizontal direction; to this cap are appended four ropes, with short bars of wood fastened

to the end. The pupils take hold of these bars, and vault or step out in a circle, increasing their velocity by degrees, and bearing with all their weight upon the ropes. When at their utmost speed, they seldom touch the ground with their toes.

## THROWING THE JAVELIN.

**THE** javelin is a tolerably heavy pole, shod at one end with an iron ferrule, or, if you prefer it, with a spike. To throw it, grasp it with the whole hand, so that the butt-end project from between the fore-finger and thumb, and the other, or shod end, from the little finger; then poise the javelin nicely, elevate it to the height of the ear; draw your arm as far back as you can, and, lastly, hurl the javelin forward with all your strength.

## CLIMBING TREES.

**SUMMER** is the proper season for this recreation, as the withered boughs may then be easily detected. Until some experience has been purchased at the expense of a few mishaps, low, stunted trees should be chosen for practice. The kind of wood and strength of the branches must always be considered; and as the surface of the branches is either smooth, or moist and slippery, the grasp should never be relaxed for an instant. By practice, the climber becomes so expert, that when the branches hang tolerably low, instead of scrambling up the trunk of the tree, by taking a short run and spring, he may seize a branch, swing himself up, and then proceed from bough to bough; or even from tree to tree, should they be planted close enough.



## SWIMMING.



The sprightly youth  
Speeds to the well-known pool, whose crystal depth  
A sandy bottom shows. Awhile he stands  
Gazing the inverted landscape, half afraid  
To meditate the blue profound below,  
Then plunges headlong down the circling flood.

THOMSON.

In the civilised states of ancient times, and especially among the Greeks and Romans, with whose practices we are best acquainted, no branch in the education of youth was considered more important than swimming; so that it was usual to say of

(98)

an uneducated person, "*neque literas, neque natere didicit*;" (he has learnt neither to read nor to swim); and,

"the same Roman arm  
That rose victorious o'er the conquer'd earth,  
First learned, while tender, to subdue the wave."

THOMSON.

Heroes, emperors, and kings — philosophers, statesmen, and poets — have been celebrated for their skilful swimming. Cæsar was a good swimmer; Cato himself taught his son to traverse rapid rivers and dangerous gulfs. The emperor Augustus taught his nephew to swim. Charlemagne was one of the best swimmers of his time; and Louis XI. swam very often in the Seine at the head of his courtiers. The heroes of the middle ages are sometimes praised for their skill in this art; and Olaf Frygesson, king of Norway, was reputed to be unequalled in it. Camoens, the Virgil of Portugal, like Cæsar, was once compelled to swim with his works in his mouth. Dr. Franklin was an excellent swimmer. Lord Byron swam across the Hellespont.

The art of swimming has, doubtless, been familiar to the inhabitants of the British Isles from the earliest times. An old English author mentions swimming among the requisites for "a complete gentleman;" and two centuries and a half since, there were persons who taught swimming in schools, in and near London. The whole of the scholars of Christ's Hospital are sent, at stated intervals, with proper attendants, to a public bath, and taught to swim; and it is an exhilarating sight to behold the crowd of ruddy-faced, healthy boys, cast off their cumbrous blue coats and yellow vests, and leap into the limpid waters to enjoy the refreshing sport.

Swimming has, however, of late years, been much neglected in this country; although there are swimming-schools in Paris, Vienna, Munich, Berlin, and many other European capitals; and in the United States of America. In some other countries, children of necessity learn to swim. In China, and in Siam, where the people live much on and near great rivers, the children have a calabash tied about their necks, so that when they fall into the water, the natural buoyancy of the human body and the confined air in the calabash cause them to float.

#### ADVANTAGES OF SWIMMING.

SWIMMING adds materially to the pleasure of bathing, as it does also to its usefulness. It calls into active exercise all the muscles of the body, and, therefore, tends much to strengthen the human frame. In addition to this bracing exercise, swimming supplies the means by which in time of accident, or of peril, we may preserve our own lives, or be instrumental in saving the lives of

others; and these humane considerations ought alone to be sufficient to induce us to acquire dexterity in this useful art.

The effects of cold bathing upon the body vary according to the constitution of the bather, and are influenced by the manner in which the bath is enjoyed. If a person, in the full enjoyment of health, plunge into cold water, and continue in it but a short time, the sensation experienced on emerging from the water is highly pleasurable; and when the body is dried, a glow of warmth pervades the whole frame, and the bather becomes refreshed and invigorated. The bather ought, therefore, not to continue for any length of time in the water; else the skin will become pale and contracted, and assume the peculiar appearance termed *goose-skin*; numbness and shivering, and a sensation of weariness, will ensue. To remain in the water after these appearances, is not only to throw away all the benefits of the previous exercise, but to bring about an exhaustion of strength, so great as sometimes to prove fatal.

In proceeding to bathe, certain precautions are necessary. Moderate exercise, accompanied by a general glow upon the surface of the body, is a better preparation for it, than total inactivity. Persons fall into sad mistakes who sit on the banks of a river, or at the seaside, to cool themselves previous to bathing. On no account would it be prudent to plunge into the water when greatly heated, and in a state of profuse perspiration; but, as a general rule, less risk will attend bathing when the body is somewhat heated, than when it is perfectly cooled.

It being of the utmost importance that the young and timid beginner should be thoroughly convinced of the buoyancy of the human body, and that it will naturally, and without assistance, float, we subjoin

#### DR. BENJAMIN FRANKLIN'S HINTS TO SWIMMERS.

"The only obstacle to improvement in this necessary and life-preserving art, is fear; and it is only by overcoming this timidity, that you can expect to become a master of the following acquirements. It is very common for novices in the art of swimming, to make use of corks and bladders to assist in keeping the body above water; some have utterly condemned the use of them; however, they may be of service for supporting the body while one is learning what is called the stroke, or that manner of drawing in and striking out the hands and feet, that is necessary to produce progressive motion. But you will be no swimmer till you can place confidence in the power of the water to support you; I would, therefore, advise the acquiring that confidence in the first place, especially as I have known several, who, by a little practice necessary for that purpose, have insensibly acquired the stroke, taught as it were by nature. The practice I mean is this: choosing a place where the water deepens gradually, walk coolly into it till it is up to your breast, then turn round your face to the shore, and throw an egg into the water between you and the shore; it will sink to the bottom, and may be easily seen there if the water be clear. It must lie in the water so deep

that you cannot reach to take it up, but by diving for it. To encourage yourself in order to do this, reflect that your progress will be from deep to shallow water, and that at any time you may, by bringing your legs under you, and standing on the bottom, raise your head far above the water; then plunge under it with your eyes open, which must be kept open before going under, as you cannot open the eyelids for the weight of water above you; throwing yourself toward the egg, and endeavouring by the action of your hands and feet against the water, to get forward till within reach of it. In this attempt you will find that the water buoys you up against your inclination, and that it is not so easy to sink as you imagine, and that you cannot but by active force, get down to the egg. Thus you will feel the power of water to support you, and learn to confide in that power; while your endeavours to overcome it and reach the egg, teach you the manner of acting on the water with your feet and hands, which action is used afterwards in swimming to support your head higher above the water, or to go forward through it.

"I would the more earnestly press you to the trial of this method, because, though I think I shall satisfy you that your body is lighter than water, and that you might float in it a long time with your mouth free for breathing, if you would put yourself into a proper posture, and would lie still and forbear struggling, yet, till you have obtained this experimental confidence in the water, I cannot depend upon your having the necessary presence of mind to recollect the posture, and the directions I give you relating to it. The surprise may put all out of your mind.

"Though the legs, arms, and head of a human body, being solid parts, are, specifically, somewhat heavier than fresh water; yet the trunk, particularly the upper part, from its hollowness, is so much lighter than the water, that the whole body, taken altogether, is too light to sink wholly under water; but some part will remain above until the lungs become filled with water, which happens from drawing water into them instead of air, when a person in a fright attempts breathing while the mouth and nostrils are under water.

"The legs and arms are specifically lighter than salt water, and will be supported by it, so that a human body cannot sink in salt water, though the lungs were filled as above, but from the specific gravity of the head. Therefore, a person throwing himself on his back in salt water, and extending his arms, may easily lie so as to keep his mouth and nostrils free for breathing, and by a small motion of his hand, may prevent his body from turning, if he should perceive any tendency to it.

"In fresh water, if a man throws himself on his back near the surface, he cannot long continue in that situation, but by proper action of his hands on the water; if he use no such action, the legs and lower part of his body will gradually sink till he come to an upright position, in which he will continue suspended, the hollow of his breast keeping the head uppermost.

"But if, in this erect position, the head be kept upright above the shoulders, as when we stand on the ground, the immersion will, by the weight of that part of the head that is out of water, reach above the mouth and nostrils, perhaps a little above the eyes; so that a man cannot long remain suspended in water, with his head in that position.

"The body continuing suspended as before, and upright, if the head be leaned quite back, so that the face look upward, all the back part of the head being under water, and its weight consequently in a great measure supported by it, the face will remain above water quite free for breathing, will rise an inch higher every inspiration, and sink as much every expiration; but never so low as that the water may come over the mouth.

"If therefore, a person unacquainted with swimming, and falling accidentally into the water, could have presence of mind sufficient to avoid struggling and plunging, and to let the body take this natural position, he might continue long safe from drowning, till perhaps help should come; for as to the clothes, their additional weight when immersed is very incon-



siderable, the water supporting it; though when he comes out of the water, he would find them very heavy indeed.

"But, as I said before, I would not advise you, or any one, to depend upon having this presence of mind on such an occasion, but learn fairly to swim, as I wish all men were taught to do in their youth; they would, on many occasions, be the safer for that skill, and on many more the happier, as free from painful apprehensions of danger, to say nothing of the enjoyment in so delightful and wholesome an exercise. Soldiers particularly should, methinks, all be taught to swim; it might be of frequent use, either in surprising an enemy, or saving themselves: and if I had boys to educate now, I should prefer those schools, (other things being equal,) where an opportunity was afforded for acquiring so advantageous an art, which, once learned, is never forgotten.

"I know by experience that it is a great comfort to a swimmer who has a considerable distance to go, to turn himself sometimes on his back, and to vary, in other respects, the means of procuring progressive motion.

"When he is seized with the cramp in the leg, the method of driving it away is to give the parts affected a sudden, vigorous, and violent shock; which he may do in the air, as he swims on his back.

"During the great heats of summer, there is no danger of bathing, however warm we may be, in rivers which have been thoroughly warmed by the sun. But to throw one's-self into cold spring-water, when the body has been heated by exercise in the sun, is an imprudence which may prove fatal. I once knew an instance of four young men, who having worked at harvest in the heat of the day, with a view of refreshing themselves, plunged into a spring of cold water: two died upon the spot, a third the next morning, and the fourth recovered with great difficulty. A copious draught of cold water, in similar circumstances, is frequently attended with the same fatal effect in North America.

"The exercise of swimming is one of the most healthy and agreeable in the world. After having swum for an hour or two in the evening, one sleeps coolly the whole of the night, even during the most ardent heats of summer.

"When I was a boy, I amused myself one day with flying a paper kite, and approaching the banks of a lake which was near a mile broad, I tied the string to a stake, and the kite ascended to a very considerable height above the pond, while I was swimming. In a little time, being desirous of amusing myself with my kite, and enjoying at the same time the pleasure of swimming, I returned, and loosing from the stake the string with the little stick which was fastened to it, went again into the water, where I found that, lying on my back, and holding the stick in my hand, I was drawn along the surface of the water in a very agreeable manner. Having then engaged another boy to carry my clothes round the pond, to a place which I pointed out to him on the other side, I began to cross the pond with my kite, which carried me quite over without the least fatigue, and with the greatest pleasure imaginable. I was only obliged occasionally to halt a little in my course, and resist its progress, when it appeared that, by following too quick, I lowered the kite too much; by doing which occasionally I made it rise again. I have never since that time practised this singular mode of swimming, though I think it not impossible to cross, in this manner, from Dover to Calais. The packet-boat, however, is still preferable."

#### TIMES AND PLACES FOR SWIMMING.

**BEFORE** breakfast, or between the hours of seven and eight in the morning during the months of May, June, July, and August,

and part of September, are the best times for swimming; but it may also be practised in the middle of the day, when, from the warmth of the atmosphere,

“Nature’s lulled—serene and still,”

if the swimmer take the precaution to keep his head constantly wetted. It is very wrong to enter the water during rain, as the water is then chilled; and through the clothes being wetted by the rain, severe colds are frequently taken.

The sea is the best place for swimming in; running rivers, and the “brook that brawls along” are next to be chosen; and the still, dull pond, the last. In either case, the bottom ought to be of gravel, or smooth stones, but quite free from holes, so that there may be no danger of hurting the feet, or sinking in the mud. Weeds must be carefully avoided, lest the feet get entangled amongst them. The swimmer should ascertain that the bottom of the stream be not beyond his depth; and if he has no one with him who is acquainted with the spot, he should endeavour to fathom it before venturing in. Bathing is best performed when entirely naked: but, if this be unsuitable, short drawers may be worn; and sometimes in jackets and trousers: the bathing-dress may be made of calico.

#### AIDS IN SWIMMING.

In deep water, under the care of an experienced person, the young beginner may be taught to swim in a much shorter time than by practising in shallow streams. For this purpose, both should go in a boat to the middle of a river, and when the learner has stripped himself, a rope should be fastened round his breast in such a manner, that it will neither tighten nor unloose; he may then get down gradually from the boat’s side into the water, or if he be bold enough, plunge in head-first. Finding himself wholly supported by the rope, he will endeavour to strike out with his arms and legs, and his teacher should show him the proper method of using them. By the bearing of the rope on his hand, the instructor can ascertain whether the learner has the slightest tendency to sink, or whether he is sufficiently buoyant to keep afloat with but little assistance. In the former case, the rope must be held tight in the hand, and the learner be allowed only to balance himself on the surface; and in the latter, the rope should be slackened, in order that he may swim out to the full length of it. This aid gives great confidence to the beginner, and proves to him what little exertion it requires to keep the head above water.



Corks and bladders are used as supports for learners; but they should never commence with either of these aids. The corks are cut into three or four slices, increas-

ing gradually in size, strung together at each end of a stout rope, with a knot to prevent them slipping off the ends. In using them, the rope is passed across the breast, and under the arms, so that the corks may be placed between the shoulder-blades, as shown in the illustration; thus buoyed up, the swimmer can strike out freely. As the swimmer improves, he may leave off the corks one by one. When bladders are used, they should be blown quite full of air, tied close at the necks, and fastened by strings to the ends of a rope; which must be passed across the breast, as directed for the corks. These aids are recommended by many persons, while others as strongly object to them: in truth, their only real service is, to enable the beginner more readily to attain the necessary actions of the hands and feet; but at the same time they take away from him all reliance on his own powers; and it has often happened, that a swimmer, after having learnt all the motions thoroughly by the aid of corks, has never been able to leave them off entirely. There is likewise some danger of corks or bladders slipping from their proper position on the shoulder-blades so low down as to keep the head under water. In some parts of England, boys are taught to swim by means of a quantity of rushes placed under the chest, which support them while they acquire the method of striking out. Inflated India-rubber cloth is also used as an auxiliary for learners.

The aid of the hand is far better than that of either of the above methods, as it can be relinquished insensibly. The best method of teaching on this plan, is for a good swimmer to carry the learner in his arms into water about breast-high, lay him nearly flat upon it, and support him by placing one hand under his chest, at the same time instructing him in the proper motion of the hands, arms, and feet: the aid of the hand may be gradually withdrawn, and in a few days the learner will be able to proceed without it.



The plank may be serviceable to enable the beginner to throw out his legs and feet. A piece of wood, a yard in length, two feet in breadth, and about two inches in thickness, will be found

best adapted for the purpose. When the pupil can support himself without the aid of corks, &c., the plank being thrown into the water, he should grasp one end of it with both hands, and striking out his legs, push it on before him; but if he let go the plank, he will probably be left to sink.



The rope is another support in learning the actions of the legs. It is generally tied to the end of a strong pole, projecting over the water; but it will answer the purpose equally well,

if fastened to an overhanging branch of a tree; the rope may be either just long enough to reach the surface of the water, or longer. The rope, however, is not so serviceable as the plank, for it keeps the holder too perpendicular in the water, to enable him to strike horizontally; whereas, all beginners should keep the legs as near the surface as possible.

#### THE CRAMP.

Those persons who plunge into the water when they are heated by exercise, and remain in it until they are benumbed with cold, or exhaust themselves by very violent exertion, are the most subject to attacks of cramp. The moment the swimmer is seized by cramp in the legs, he must not suffer himself to feel alarmed; but strike out the limb affected with all his might, keeping the heel downward, and drawing the toes as upward as he can,

although at the time, these movements may give him great pain; he may also turn on his back, and jerk the limb into the air, though not so high as to throw himself out of his balance. Should these attempts prove unsuccessful, he must try to reach the shore with his hands; or, at all events, keep himself afloat until assistance can be procured. If he cannot float on his back, he may swim upright, keeping his head above the surface, by striking the water downward with his hands near his hips; and he can thus make steady progress without using his legs. If only one leg be attacked, the swimmer may strike forward with the other: and to acquire confidence in cases of cramp, it is advisable to practise swimming with one hand and leg; with the hands only, or even with one leg.

#### ENTERING THE WATER.—STRIKING OUT.

THE tutor never ought to compel young beginners to leap into the water contrary to their inclination. Before entering, it is necessary to wet the head, in order to prevent the pressure of the water forcing the blood up into the head too quickly. Dr. Franklin recommends the young learner to walk into water up to the breast; next, to lie down gently on his belly, keeping the breast advanced forward, and the thorax inflated; and then, drawing up his legs from the bottom, to strike them forward alternately with the hands. The back can scarcely be too much hollowed, or, the head too much thrown back; as those who neglect these points, will swim with their feet too near the surface, instead of allowing them to be about two feet deep in the water. The hands should be placed just in front of the breast, the fingers pointing forward, and kept close together, with the thumbs to the edge of the forefingers; the palms undermost, and slightly hollowed. The hands should be struck forward to their utmost extent, so as not to break the service of the water, but to make a sweep from as low as the hips, level with the breast: next, draw them back again quickly, by bringing the arms toward the side, bending the elbows, and letting the hands hang down, while the arms are raised, and the hands are brought together as before. In moving the legs alternately with the hands, they must be drawn up with the knees inward, and the soles of the feet inclined outward, and pushing against the water, and they should then be thrown backward as widely apart as possible. These motions of the hands and legs may be practised out of the water; and whilst exercising the legs, which can only be done one at a time, the learner may rest one hand on the back of a chair to steady himself, while he moves the opposite leg. In short, to advance properly, and secure regular buoyancy, the hands and

feet must act alternately; the arms descending while the legs are rising, and the arms rising while the legs are descending. The practice of rising with the water at every stroke, or *breasting*, should be avoided, as it tires the body, and is inelegant. If the learner, in his first attempts, sink a little, or swallow some water, he must not be discouraged, as all beginners experience such trifles; whilst the difficulty of breathing, felt on first entering the water, will vanish, as proficiency is acquired. The swimmer should draw in his breath at the instant that the hands, descending to the hips, cause his head to rise above the surface of the water; and he should exhale his breath at the moment his body is propelled forward, through the action of the legs; if he act contrary to these rules, he must inevitably draw in water every time he breathes.

## PLUNGING.



WHEN taking the leap to plunge into the water, the swimmer must keep his legs together, and his arms close also. If the plunge be taken with the feet foremost, they should be kept close together, and the body somewhat drawn backward. There are two methods of plunging with the head foremost:—the flat, and the deep; in the flat method, only adapted for shallow streams and low banks, the

swimmer must fling himself as far forward as possible into the stream, and when he touches the surface, he should raise his head, keep his back hollow, and stretch his hands forward, flat and slightly inclined upward; by this plan, ere the impulse ceases, he may strike some distance, just beneath the surface of the water. When about to take the deep plunge, he must stretch his arms out, lean his body forward, bend his knees, and place himself in the position shown in the illustration; and in this way he can take the plunge without making the least noise. This method is only applicable where there is a good depth of water, which must, of course, be ascertained beforehand.

## DIVING.

THE dive may be taken by holding both hands above the head, casting head-first from a raised bank, and striking the water

in descending with the calves of the legs; or by jumping in sideways, yet head-first; or taking a run to the edge of the stream, and leaping in, feet-first. The best method is the first mentioned; and by keeping the head toward the bottom, and with the feet striking the water, the diver may propel himself under it to a considerable distance. While descending, the head should bend toward the chest, the back should be rounded, the legs thrown out with more energy than in ordinary swimming; and the hands and arms must be moved lower, and passed rather more behind the body. The eyes, which have been shut for safety in descending, should be opened when beneath the surface; if the water be clear, it will enable the diver to ascertain the depth and see any obstacle. To ascend, bend back the head, strike the hands out high, bring them vigorously down, and you will then very quickly rise. The diver must, of course, hold his breath all the time he is under water.

Many extraordinary feats of divers are recorded. On the shores of the Mediterranean, the natives, dive dexterously in shell-fishing, gathering bits of rope in the harbours, and picking out oakum from the ships' bottoms. But the most wonderful feats are those of the pearl-divers of Ceylon, who usually remain under water two minutes; and some have been known to continue there four, or even five minutes.

#### SWIMMING IN DEEP WATER.

WHEN the learner has acquired some facility in swimming, and wishes to try to swim out of his depth, he should first venture to cross a stream which may be a foot or two overhead in the middle. He must not be alarmed at not feeling ground under his feet, or make quick and short strokes, and breathe at the wrong time, so that he involuntarily swallows water; all which mishaps, of course, increase the hurry and agitation, and make it difficult for him to get back to shore. Learners should therefore never venture out of their depth, without having first practised such distances only as they are certain they can accomplish; for if they can swim eight or ten yards without allowing their feet to touch the bottom of the river, they may fearlessly attempt to cross a deep stream of only half that width, and so on, increasing the distance by degrees; they will thus progressively attain presence of mind, and find that the deeper the water, the greater will be its sustaining power, and the easier they will be enabled to swim in it.

#### UPRIGHT SWIMMING.

THIS mode of swimming, which closely resembles treading the water, is much recommended by Bernardi, an ingenious Nea-

politan, who has written a treatise upon the subject. His reasons for preferring the upright position to the horizontal one, as commonly practised, are its conformity to the accustomed movement of the limbs; the freedom it gives to the hands and arms; seeing all around; a much greater facility of breathing; and, lastly, that much less of the body is exposed to the risk of being caught hold of by persons struggling in the water.

Again, it is natural for man to advance in the water as he does on land; and though a person swimming in an upright position advances more slowly, he can continue his course much longer by this method, and at the same time husband his strength, and be thus enabled to remain long in the water with safety.

The first object of Bernardi's plan is to enable the pupil to float in an upright posture, and to feel a decided confidence in the buoyancy of his body. He first supports the pupil under the shoulder, until he floats tranquilly, with the head and part of the neck above the surface, the arms being stretched out horizontally ~~under~~ *under* water: from time to time the supporting arm is removed, but again restored, so as never to suffer the head to sink, which would disturb the growing confidence of the learner.

In this early stage, the unsteadiness of the body is the chief difficulty to be overcome by the head, which, like the rudder of a ship, is the regulator of our movements in water. The smallest inclination of the head and neck to either side instantly operates on the whole body, and, if not corrected, will throw the body into an horizontal position. The pupil has, therefore, to be taught how to restore any disturbance of the balance, by a cautious movement of the head alone in an opposite direction.

The learner is then taught the use of the legs for balancing the body in the water: one of these being stretched forward, and the other behind, and the arms laterally, he will soon find himself steadily sustained, and independent of further aid in floating.

Next is shown the sweeping semicircular motion of the arms: this is practised slowly without motion forward, until attained with precision; after which, a slight bending of the body occasions its advance. The motion of striking with the legs is added in the same measured manner. The strength may be recruited by using the arms and legs alternately, turning first the right shoulder and then the left to the water; for, by this means, less resistance is opposed, than by presenting the whole breadth of the breast.

The upright position, a little inclined backward, (which, like every other change of posture, must be done *deliberately*, by the corresponding movement of the head); reversing, in this case, the motion of the arms, and striking the flat of the foot down and



a little forward, give the motion backward, which is performed with greater ease than when the body is laid horizontally on the back.

Such is an outline of Bernardi's method of teaching the art of swimming; by which he calculates, that, at every stroke, a swimmer ought to impel himself forward a distance equal to the length of his body; and, in general, at the rate of three miles an hour. In consequence of Bernardi's successful practice, he was appointed to instruct the youths of the Royal Naval Academy of Naples, in the art of swimming.

The upright mode of swimming is far more secure than the ordinary system, and it may be learned in one-twentieth part of the time. A young Italian, after eleven days' instruction by Bernardi, is stated to have swum a circuit of nearly six miles in the bay of Naples, although he was previously unacquainted with swimming.

The natives of New South Wales swim nearly upright, and generally backward, yet with much skill and velocity: indeed, they swim and turn with such swiftness, even under water, that they see and spear fish while beneath the surface.

#### TREADING WATER.



In treading water, the position of the swimmer is perpendicular, as in Bernardi's system; but the progressive motion is gained by the action of the legs only. This method is of value when swimming to a long distance as the strength can be very much husbanded by it; and it may often enable a swimmer to succour

a drowning person. The arms must be crossed over the body, or against the hips, and the legs should be used as in front swimming, but more quickly; for every stroke, acting in a perpendicular direction, raises the body high out of the water, and, of course, unless the movements are performed with rapidity, the swimmer will sink too low between each stroke. There is another method of treading water, in which the swimmer bends his legs, as if in a half sitting posture — shown in the illustration — when he moves his legs alternately; that is, he makes a circle with one leg, whilst he keeps the other still. By this mode,

his body does not jerk up and down, but continues at nearly the same height in the water.

## SIDE SWIMMING.



This may be performed either on the right or left side, and as the feet have to perform their usual motions, special instructions are required for the action of the hands only. To swim on the

left, lower that side in the water, and at the same time raise the right; then strike forward with the left hand, and sidewise with the right, keeping the back of the latter to the front, with the thumb side of the hand downward, to act as an oar; in turning on the other side, strike out with the right hand, and use the left as the oar. For both sides, stretch out the lower arm the instant that a stroke is made by the feet; and strike with the upper arm on a level with the head, at the instant that the feet are urging the swimmer forward; and while the upper hand is carried forward, and the feet are contracted, the lower hand must be drawn toward the body. This method of swimming is full of variety, and enables the swimmer to cut through the water with great rapidity; but it is very fatiguing, and seldom used except for short distances.

## THRUSTING.



In this variety, the feet are used as in front swimming, but the hands very differently. One arm, (say the right,) should be lifted wholly out

of the water, thrust forward to the utmost stretch, and then dropped, with the hand hollowed, into the water, which it must pull to the swimmer crosswise, in the direction of the opposite arm-pit. In the mean time, sustain the body by working the left arm and open hand in a small circle; and, as the right arm pulls toward the body, pass the left, in a larger circle than before, quickly, under the chest to the hip. The left arm is next lifted out of the water, and the movements before described made with it; circles, &c., are then performed by the right arm. The

movements of the feet are made during the performance of the large circle by either arm. Thrusting is a masterpiece of swimming, ensuring great progress with little fatigue.

### BACK SWIMMING.



THIS is the easiest, but certainly the slowest, system of swimming, and is chiefly used as a relief to the arms. The learner should lie down gently upon his back, keep the head in a line with it, and raise only his face and breast above water.

The hands should be placed upon the thighs, and the legs moved as in forward swimming; taking care that the head and breast are kept unmoved by the action of the legs; and that the knees are not brought together, when drawn up, or raised above the surface of the water; else, the learner's head will be entirely immersed. When he wishes to turn from front to back swimming, he should raise his legs forward, and throw his head backward; and when turning from the back to front, the legs must be dropped, and the body thrown forward. These changes of position must be made immediately after throwing out the feet. There is a variation of back swimming, called "winging," in which the swimmer employs his arms as well as his legs; the arms must be extended in a straight line with each other, and then struck down to the thighs, keeping the palms of the hands inward, and the thumbs pointing downward; the hands should next be moved edgewise, and the arms raised as before, and so on. The legs should invariably make one stroke as the arms are elevated, and another as they are struck down. Finning differs from winging, only in the stroke of the arms being made shorter, and at the same moment as the action of the legs.

### FLOATING.



IN order to float, the swimmer should, whilst gently moving his legs, stretch out his arms parallel with the sides of his head, and just

below the surface of the water; his head should be some-

what deeply immersed in the stream, but his chin raised higher than his forehead, as represented in the accompanying illustration. Whilst in this position, he should inflate his chest, and keep it as much inflated as possible, discontinue the action of his legs, and place his feet close together: he will thus be enabled to float with ease, rising and falling a little with every inspiration and expiration.

TO BEAT THE WATER.

THE learner of this feat should, while swimming on his back, lift up his legs alternately out of the water, and then strike them down, so as to dash the water into the air; to achieve this, he must swim steadily on his back, keeping his breast almost out of the water, his body being supported by his hands, with their open palms downward. Some persons not only lift their legs out of the water, but at the same time turn round in it: such movements require no special instructions, but practice on the part of the swimmer.

TO CARRY THE LEFT LEG IN THE RIGHT HAND.

WHILE swimming on the breast, lift up the left leg, bend it toward the back, and take hold of it with the right hand; then, continue your progress by the action of the other leg and hand. This method is exceedingly useful when the swimmer is attacked by cramp.

TO SHOW BOTH FEET OUT OF WATER.

WHEN swimming on your back, incline the small of it downward, paddle your open hands to and fro across your breast like oars, and thus sustain your body, while you gently lift your feet above the surface of the water.

TO SWIM UNDER WATER.

WHEN you have dived as deep as you wish, strike out with your hands, taking care to tuck up the thumbs till the tips of them almost touch the inner part of the lowest joints of each little finger (to prevent the hand being too concave), and keep the tips of the fingers pointed downward, toward the bottom. If you would swim midway between the bottom and the surface, make the strokes of the arms and hands inward, i. e., toward you, as if you would embrace the water by large armfuls, keeping the thumbs turned rather downward. These are most important manœuvres. You are thus enabled to pass unseen across a river or branch of water; or to search for anything which has fallen to the bottom; and also to rescue any one who is drowning.

## TO SWIM LIKE A DOG.

In this method of progression, each hand and foot must be employed alternately: thus, suppose the swimmer to begin with the right hand and foot, he should simultaneously draw his hand toward his chin, and his foot toward his body; he should next strike forward with his hand, and at the same instant backward with his foot; and repeat these movements with his left hand and foot. The hands should be thrust out a little beneath the water, with the palms downward, and next returned slightly hollowed, so as to pull the water toward the body of the swimmer. This mode is not adapted for rapid swimming, but as a variety; whilst it may relieve a swimmer considerably.

## TO SPIN IN THE WATER.

For this sportive swimming, the person should be somewhat buoyant; the breast must be well inflated, and the attitude may be that of sitting with the feet crossed. Then embrace the water with each hand alternately, on the same side. In order to turn to the right, the water must be embraced with each hand alternately on the right side; and, to turn to the left, on the left side. This action causes a circular or spinning movement, which increases in velocity as it is continued.

## TO ROLL IN THE WATER.

By this playful swimming, boys may roll along the stream as they roll down a hill on a summer's day. A running stream should be chosen, as it assists the turn. To achieve this, lay yourself straight across the current, inflate the breast, and hold the head very backward; the legs may either lie together or be crossed; and exercise the hands in the same manner as in spinning. By this alternate action of the hands, with the aid of the stream, you may roll along in an agreeable manner.

## SWIMMING SCHOOLS.

BESIDES the Floating Baths which are moored, during the season, on the Thames, near the metropolitan bridges, there are several other public baths in London. At most of these establishments, instructions in swimming may be received for a trifling gratuity; and a "British Swimming Society" has been formed for appointing masters of approved ability to teach swimming at the various public baths, and on the Thames; and the Serpentine, in Hyde Park. In the latter sheet of water, are frequently swimming matches; and it is estimated that 200,000 persons bathe here every season.

## CAUSES OF DROWNING.

DR. ARNOTT states the following reasons why, in ordinary accidents, so many persons are drowned, who might easily be saved:

1. Their believing the body to be heavier than water, which it is not; and, therefore, that continued exertion is necessary to keep them swimming, by which means they become the sooner exhausted.

2. From a fear that water, by entering the ears, may drown, a wasteful exertion of strength is made to prevent it; the truth being, however, that it can only fill the outer ear, or as far as the membrane of the drum, and is therefore of no consequence. Every diver and swimmer has his ears filled with water, and with impunity.

3. Persons unaccustomed to water, and in danger of being drowned, generally attempt, in their struggle, to keep the hands above the surface, from feeling as if their hands were tied while held below: but this act is most hurtful, because any part of the body kept out of the water in addition to the face, which must be out, requires an effort to support it, which the individual is supposed at the time to be incompetent to afford.

4. Not knowing the importance of keeping the chest as full of air as possible, the doing of which has nearly the same effect as tying a bladder of air to the neck; and, without other efforts, will cause nearly the whole head to remain above the water. If the chest be once emptied, while, from the face being under water, the person cannot inhale again, the body remains specifically heavier than water, and will sink.



## SKATING.



Where the Rhine  
Branched out in many a long canal extends,  
From every province swarming, void of care,  
Batavia rushes forth; and as they sweep  
On sounding skates, a thousand different ways,  
In circling poise, swift as the wind along,  
The then gay land is maddened all to joy.

THOMSON.

SKATING is one of the most amusing and invigorating out-door exercises. Its art consists in balancing the body, while it is impelled upon the ice by alternate impulses of the feet, on a sharp ridge of iron beneath the soles of the feet.

Skating is of considerable antiquity in this country: for, upwards of six centuries since, the young Londoners fastened the leg-bones of animals under the soles of their feet, by tying them round the ankles; and then, by aid of an iron-shod pole, impelled them-

(116)

selves along the ice, in the exaggerated language of the old chronicler, "as swiftly as a bird flyeth in the air, or an arrow out of a crosse-bow." Olaus Magnus, a Swedish writer, of the sixteenth century, describes the skates as being at that time made of polished iron; they were also rudely made of the shank-bone of a sheep or stag; at the same period also were used wooden shoes, which were armed with iron points, flexible circles, sharpened every way into teeth, and triangular points of iron. The wooden skates shod with steel, such as are now used, bound about the feet and ankles, like the *talares* of the Greeks and Romans, are generally supposed to have been invented in the Low Countries; and certainly were introduced into England from Holland. At the present day, the Dutch, both male and female, are allowed to be the best skaters in Europe: on the frozen canals, the peasant-girl skates to market with provisions on her head, the senator to his assembly, and the clergyman to his church.

In Friesland, it is not unusual for a person to skate for a long time at the rate of fifteen miles an hour. In a skating race at Groningen, in 1801, two young women won the prize, having performed a distance of thirty miles in two hours. In England, some very skilful and swift skaters have figured: one of the most surprising feats on record, is that of a Lincolnshire man, who, in the year 1821, for a wager of one hundred guineas, skated one mile within two seconds of three minutes—a rate almost equalling that of a race-horse.

In London, too, in some seasons, the skating is distinguished by extraordinary grace and elegance; and skating-clubs have been established here as well as in Edinburgh, for the cultivation of this truly exhilarating art.\* Such perfection can, however, only be attained by courage, quickness of eye, and practice, founded upon certain rules, a few of which are briefly stated for the benefit of the learner.

#### THE SKATE.

The *skate* should have its wooden sole of the same length as the boot; it should be somewhat hollowed to receive the ball of the foot, and lowered to receive the boot-heel, in which should be bored a hole of the precise size to receive the peg of the skate: for much depends on the foot being firmly in contact with the skate. The "iron" should be of good steel, about a quarter of an inch thick, three quarters of an inch in height, and securely fastened into the wood. Fluted irons are only fit for very light lads, as

---

\* An ingenious method of enjoying this pastime in summer as well as in winter, and within-doors, has been supplied by the application of *artificial ice*, with which the floor of an apartment is covered, so as to afford a sheltered area for the stay-at-home skater.



the sharp edges are apt to cut too freely into the ice, and spoil the figuring; and the ice-cuttings often collect and harden in the grooves, so as to raise the skater from the edge of his skates, and thus endanger his balance. He should wear a closely-fitting dress, as full and loose clothes will catch the wind, and retard his progress. Boots which lace up are preferable to any other kind; as they fit the ankle closely, without which the straps of the skate cannot be drawn tight. The skater should learn how to fasten his skates on before he ventures on the ice; and he should practise walking in them in a room, balancing on each foot alternately. A stick or light pole may be carried in the hand, and may occasionally be useful to the young skater, in maintaining his equilibrium; but when he first ventures on the ice, he should rather trust the aid of a friend's hand; though, even this assistance should be dispensed with as soon as possible, so that the young skater may balance himself properly; and, on the whole, he had better go on alone, until he feels the edge of the skate, when he may take confidence in improvement. We proceed with a few **GENERAL INSTRUCTIONS**.—Choose ice only of moderate roughness. Begin fearlessly, but not in a hurry. Keep the feet near together, the heels still nearer, and the ankle of the foot on the ice firm, the leg gracefully straight; and the body erect, although it may be inclined a little forward at starting. Avoid swinging the arms, but raise them with ease alternately with the legs, so that the arm



and leg of the same side may neither be elevated nor depressed together. As the skates cut channels in the ice, the skater should not fear a fall on one side, provided his skates be properly fastened on his feet; all that he has to guard against, is the probability of tripping backward or forward, and this he will overcome with a little practice. To stop, bring both feet to the ice, and allow the impetus acquired to subside by degrees; stop at once, by pressing on the heels of the skates, taking care that in so doing, you do not overbalance your-

self, and thus fall backward. The stop may also be made by turning short round, either to the right or left.

In striking into the *Ordinary Run*, keep your left foot firm, with the inner edge of the skate bearing a little on the ice; then boldly throw out the right foot, until the outer edge of that skate touches the ice; at the same time throw steadily the right shoulder forward, and keep the body balanced on the right leg as long as possible; then throw out the left foot and shoulder in

the same manner, and thus, alternately changing the feet, continue to progress. This movement must be practised until the skater has acquired firmness, power, and complete control over his balance; when he may venture on another step.

#### THE FORWARD ROLL.



THE forward roll is the first step in figure-skating, as, when the learner is once perfect in it, he may easily attain the rest. The impetus is obtained as in the ordinary run; but, in order to get on the outside edge of the right skate, whilst moving on that foot, bring the left shoulder forward, draw back the right arm, look over that shoulder, and boldly incline the body to that side, keeping the left foot off the ice; next, moderately jerk the left foot forward, and set it down on the ice before it is more than ten or eleven inches in advance of the other foot:

then, by striking outside to the left, and in the same direction with the inside of the right skate, you will be propelled from right to left, by bending the body to the left, as you did before to the right; in this manner, change from left to right, and *vice versa*, keeping yourself upright, and bearing chiefly on the heels.

#### THE DUTCH TRAVELLING ROLL.

THE Dutch travelling roll is performed on the outside edge in the manner described above, making only small portions of very large circles: thus,



from A to B on the right outer edge, C to D, on left outer edge, E to F, on right outer edge, &c., so as to keep as much in a straight line as possible.

#### THE FIGURE OF EIGHT.

THE figure of 8, is also performed on the outside edge and is nothing more than finishing the circles, of which small portions were described in the travelling roll: in order to achieve it, as you near the finish of the stroke on the right leg, cross it with the left one, and thus bear more firmly on the outside of the right skate; whence, strike directly, and, at the same moment, throw the left arm back, and look over that



shoulder, which will bring you well upon the outside of the same

or left skate. By thus finishing a circle on each edge, you complete the figure 8 as above represented. Another method of making the figure of eight is by combining two figures of three.

#### THE FIGURE OF THREE.

**3** The figure of 3 is formed by changing on the same foot, from the outside edge forward to the inside backward; the head of the three is made on the outside edge of the heels; and next lean quickly forward, rest on the inside of the same foot, and by the backward motion thus acquired, finish the figure as in the annexed representation, which shows the 3 as described by the right foot, the figure being reversed when performed by the left. Having finished the 3, and neared the left leg up to the right, instead of passing it on as if to complete a circle, throw it off to the side, turn the head as if to look over the left shoulder, and bend the body in the same direction: thus, you will be thrown on the inside of the skate, and, through the impulse originally gained, continue moving on the inside edge backward. If the change cannot easily be made by this means, you may swing the arm and leg slightly outward for aid, but only until the end is attained; as all changes from one edge to the other must be made by the motion of the body only, not by swinging. Although the above is termed *backward skating*, the skater himself moves sideways, as his face and body are always towards the direction in which he wishes to proceed, and his skates only move heel foremost.

#### THE OUTSIDE EDGE BACKWARDS.



To perform the outside edge backward, after finishing the 3, put down the other foot on its outside edge, and being still carried on by the first impulse, continue to move slowly back, and so make the annexed figure. In putting the right foot down, throw back the left arm and shoulder, turn the face over that shoulder, and instantly lift the left foot from the ice. If you cannot at once raise the foot on which you have just finished the 3, and so rest on the outside of the other skate, you may continue on both for a short space, lifting the other off the ice as you gradually acquire confidence; and this plan of using both feet in finishing a figure has a very good effect. In



skating backwards, be careful that you do not lose your balance and fall; and you should see that the ice is free from weeds and stones.

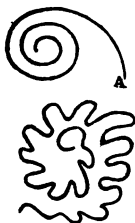
A circle may also be performed with both skates on the ice, by pointing the feet toward the side to which you intend to turn; and at the same moment giving the shoulders, chest and arms, a swing in that direction at the same time: this movement should also be practised backward, in which case the arm opposite to the direction in which you wish to turn, should be swung forcibly back, bringing the weight of the chest to bear with the arm, and turning the face over the same shoulder. In twirling or pivoting on one heel, swing your arms round, with all your force, taking care to preserve your balance, as a fall might be of serious consequence.

### THE BACK ROLL.

THE back roll will enable you to move from one foot to another: if, for instance, you have finished the figure of 3 on the right foot, and have thus, with some impetus, thrown yourself on the outside back edge of the left—not bearing very hard on the edge, as the aim is to shift the motion from the left to the right foot—you may throw the left shoulder and arm back, and turn the face so as to look over them; and thus bearing the inside of the left skate upon the ice, instantly dash from it to the outside back of the other skate, by bearing it into the ice powerfully at the toe; thus you achieve the backward roll on the right foot, to be repeated. As the strokes are weak and almost powerless in the back roll, you may renew the impulse by making the figure of three afresh.

### MISCELLANEOUS HINTS.

THE various movements we have now described will enable you to perform different figures, as, the CORNUA AMMONIS, the DUTCH MAZE, &c.: the former is begun at A, and the figure is repeatedly and quickly turned round either way; and the latter should also be performed in the same manner: both will prepare you to join gracefully in waltz and quadrille skating. You need not confine yourself to any of the figures laid down by rule, as on the surface of the ice there is “ample room and verge enough” to trace any device that your own genius may prompt you to invent. Skating has its perils, from which, however, common caution will protect you.



Should you get upon rotten ice, and be unable to extricate yourself, crawl over it on hands and knees; and if you unluckily fall prostrate on it, endeavour to roll away to where the ice is somewhat firm. If you fall into a hole, throw your arms out horizontally over the edge of the unbroken ice; and, thus supported, tread the water, until assistance arrive, and a rope be thrown for you to catch at, or a plank be pushed toward you for rescue. Never venture on the ice, unless it be sufficiently strong to bear your weight; as it is mere bravado to attempt figuring before the ice is compact and firm, or after a thaw has commenced.

Much of the danger incident to skating may be obviated by wearing a *safety cape*, which is the invention of a member of the Skating Club of Edinburgh. This cape, which is suited to lie easily round the neck and shoulders, is formed of Macintosh cloth, which may be partially inflated with air at pleasure, by means of a small mouth-piece. The cape hangs down all round as low as the elbows: when blown up, it swells to about an inch in thickness; and a tape from the inner part of the back, to be tied round the body, keeps the cape down, in the event of immersion in water.



## ARCHERY.



In my tyme, my poore father was as diligent to teach me to shoote as to learn any other thyng; and so I think other men did theyr children. He taught how to drawe, how to laye my body in my bowe, and not to draw wyth strength of armes, as other nacions do, but wyth strength of body.

LATIMER'S SERMONS, Black letter, 1549.

THE implements of archery in England have been of two kinds: the arbalest, or cross-bow, and the long-bow, and their respective arrows. Our ancestors used the latter for a double purpose; in time of war, it was a dreadful weapon of destruction; and in peace, it became an instrument of manly amusement. Both the Anglo-Saxons and the Danes were, doubtless, acquainted with the use of the bow; though, probably more for pastime than as a weapon of warfare. The Normans, however, used the bow for the latter purpose: their hard-earned victory over the Saxons, at the battle of Hastings, may be mainly attributed to the superior skill of their bowmen; and, under the Norman government, the practice of archery was not only much improved, but generally diffused throughout the kingdom. Thenceforth, the English became the best archers in Europe, as attested in their brilliant victories at

(123)

Cressy, Poitiers, and Agincourt; but, although they employed the cross-bow, the great fame acquired by our countrymen in archery, was derived from their practice with the long-bow; and to this instrument they gave the preference.

Archery appears to have been much practised as a pastime in the reign of Edward III., when it was enacted by law, that holidays should be spent in recreations with bows and arrows. Richard II. and Edward IV. made similar ordinances; the latter, that every Englishman and Irishman dwelling in England, should have a long-bow of *his own height*, to be made of yew, wych, hazel, ash, or awburne, or any other reasonable tree; and that butts should be set up at every township, at which the inhabitants were to shoot upon all feast-days, or be fined one halfpenny for each omission. In the reign of Henry VII., all the gardens in Finsbury were destroyed by law, "and of them was made a plain field for archers to shoot in," this being the origin of what is now called "the Artillery Ground." Henry VIII. prohibited the use of the cross-bow, and made several laws in favour of the long-bow; enjoining that each householder should have a bow and arrow continually in his house, and provide bows and arrows for his servants and children. Henry himself shot as well as any of his guard; and he regulated the price of bows, so as to bring them within the means of nearly all classes of his subjects. In this reign, too, it was customary at Bartholomew-tide, for the lord mayor, sheriffs, and aldermen, to go into the fields at Finsbury, where the citizens were assembled, and "shoot at the standard with broad and flight arrows for game." The London Artillery Company, known also as the Archers of Finsbury, and formed in the time of Edward I., was incorporated in this reign.

Archery now became a fashionable amusement. Edward VI. was fond of the pastime: in his Journal, he records, that some of the archers of his guard shot at an inch board, and quite pierced it through with the heads of their arrows. In this reign, the scholars of St. Bartholomew, who held their disputation in the cloister of Christ's hospital, were rewarded with a bow and silver arrows. Elizabeth, too, regulated the price of bows, and was herself a skilful markswoman: in her reign, lived Ascham, an author well versed in archery, and whose name is given to one of the equipments of the art. Charles I. was an excellent archer, and forbade, by proclamation, the inclosure of the shooting fields near London. Public exhibitions of shooting with the bow were continued in the reigns of Charles II. and James II.; and an Archers' division, till within these few years, formed a branch of the Artillery Company of London. About 1753, targets were erected in Finsbury fields, during the Easter and Whitsuntide holidays. In 1789, the revival of archery, as a general amusement, was attempted under the patronage of the Prince of

Wales; and societies of bowmen, or toxopholites, were formed throughout the kingdom, with printed rules and orders. In the present century, similar attempts have been made, especially in Somerset, Berkshire, Essex, and Suffolk. Several archery societies exist in the neighbourhood of London; and the Toxopholite Society have a picturesque lodge, and five acres of shooting ground, upon the southern side of the Regent's Park.

But, the most ancient society of this kind now existing, is "The Royal Company of Archers, the Queen's Body-guard of Scotland," stated to have been instituted by James I.: they have received charters and grants from succeeding sovereigns, and to this day they form part of the royal household. They acted as body-guards to George IV. and Queen Victoria, on their visits to Scotland: the company consists of about five hundred members; the field uniform is dark green cloth, braided with black, and a stripe of crimson velvet, and in the hat are worn a medallion and plume of black feathers: they bear two standards, and their captain-general the Duke of Buccleuch, rode in the coronation procession of Queen Victoria.

Archery, as a branch of school amusement, existed at Harrow till late in the last century; and one of the three games allowed by the original regulations of the school in 1596, was "shooting," for which all parents were required to furnish their children "with bowstrings, shafts, and breasters." An annual exhibition of archery was held on August 4, when the scholars shot for a silver prize arrow: the last was contended for in 1771, since which period public speeches have been substituted.

#### BOWS.

In the olden time, bows made of yew-tree were the most highly prized, on account of their superior strength and elasticity; of late years, however, several kinds of foreign wood have been used in the manufacture of bows, and have been found, in point of durability, almost to rival the yew. Amongst these woods, the scarcest is the dark ruby, which is brought from the East, and held in very high esteem by the bowyers; the laburnum, thorn acacia, tulip, cocoa, purple, and rose woods, form excellent bows, particularly when properly backed with hickory or hornbeam. The yew, in the opinion of many writers and archers, however, still asserts its superiority over all the other woods: and foreign yew is, perhaps, unrivalled, especially if backed with hickory; but the difficulty of procuring a branch perfectly sound and free from fault, of a sufficient length, renders a yew bow by far the most expensive. Lancewood bows rank next in estimation to the yew, and are, if anything, rather more elegant than the latter in their appearance.



Bows made of two pieces of wood joined together, and thence called *backed*, are much stronger than *self*, or those made of one piece only; the flat or outward part of a bow is termed the back, and the round or inward part, the belly. The proper length of a bow for youth is five feet; and, as it is an expensive article, and when well adapted to his size and strength, highly prized by the archer, great care should be taken to preserve it from even the slightest injury. At the end of the day's shooting, therefore, it should be unstrung, and placed in an oil-skin case, lined with baize, and it should always be kept in a temperate atmosphere; when to be laid aside for the season, it must be well rubbed with linseed oil and bees'-wax; indeed, by many archers, this precaution is taken before putting it in the case, at the conclusion of the day's sport.

#### THE STRING.

THE string is a very important part of the bowman's apparatus, and must be selected with great care. The best strings are made of hemp; for catgut being extremely susceptible of heat and moisture, does not always retain the proper degree of tension. The strength of the bow must entirely regulate the thickness of the string: a thin string will cast the arrow furthest, but a stout one with by far the greatest certainty; yet the choice is of no great consequence, provided the string be not *too* thin for the power of the bow, especially if the bow be a backed one; for, should the string break, the concussion might shatter the bow to pieces. In general, an eye is made at one end of the string only, it being left for the archer himself, (as bows are of various lengths,) to make the noose at the other end; this he will find, at first, rather difficult to accomplish, but if he examine the noose on an old string, he will readily ascertain the proper method of doing it. At the nocking-point, or that part where the nock of the arrow is usually put, and for the space of three fingers above and below the point, the string should be whipped or bound round with silk, or fine twine, well waxed with bees'-wax; this whipping is of great importance, as it preserves the string from wearing, and also fills the nock of the arrow, which should always fit rather tightly. The noose should be very carefully whipped, as the string is extremely liable to chafe at that part; indeed, many archers whip the eye also; but that is not so necessary, although, on the whole, it makes the string more complete. Whenever the whipping wears off, the string should be immediately re-whipped; and when several of the threads of a string are worn, throw it away, it being hazardous to use an imperfect one, for, "it is an yll-saved halfpenny that costs a man a crowne;" it is, therefore, good

policy to have two or three spare strings in readiness, in case of accident. If the string be now and then rubbed with bees'-wax, it will be much improved, as well as rendered more impervious to moisture. Never let the string become twisted or ravelled through negligence; but if by any chance it should become so, re-twist and wax it before you use it again.

#### TO STRING THE BOW.

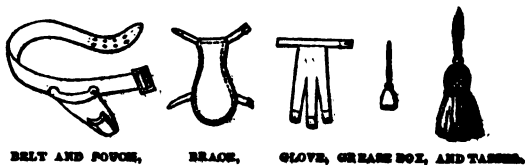
**REMEMBER** that the inward part, or belly of the bow, should be bent inward, and the flat, or back part, should be bent outward; and that any attempt to bend the bow the reverse way, would most probably shatter it to pieces. With the right hand, grasp the bow by the handle, or part round which the binding is wound, holding the back of the bow toward you, and keeping your wrist close to your side; then place the lower limb of the bow—which can always be readily distinguished from the upper, by its having a shorter horn—against the inside of the right foot, and incline the foot inward, to keep the bow from slipping. Next, place the centre of the left wrist on the upper limb of the bow, and close to the string-eye; keep the arm straight, and let the tip of the thumb be on one edge of the bow, and the knuckle of the fore-finger on the other. Pull the bow smartly back with the right hand, and press it down with the left; slide the wrist up toward the horn, and then with the fore-finger and thumb drive the eye of the string into the nock; and before the hand is withdrawn, see that the eye is correctly placed in the nock. In doing the above, be sure to keep the three unemployed fingers clear of the string, for if they get between it and the bow, they will most probably receive a sharp pinch. The left leg should be planted about three quarters of a yard in advance of the right, and kept quite straight, in order to give a proper steadiness to the attitude; but the right knee may be slightly bent. Before stringing the bow, carefully examine the string to see that it is not twisted, and that the noose is exactly in the centre of the nock. If the young archer do not succeed in stringing the bow, in his first or second essay, he must not be discouraged, as it requires a certain knack or method to perform it correctly and readily, which knack can only be attained by practice. In unstringing the bow, the attitude is precisely the same as in stringing it: the lower horn must be placed against the right foot, the middle of the bow grasped in the right hand, and the left wrist placed on the upper horn, so that the fore-finger may with facility reach round the eye of the string; by pressing the bow down with the left hand, and pulling it sharply back with the right, the string will become slackened; and then, in an instant, with the fore-finger, raise the eye out of the nock.

## THE ARROWS.

ARROWS are generally made of ash, red deal, and a light white wood, very similar in appearance to that of the abele and lime trees; fletchers hold the red deal in the highest estimation, but as it wears out rapidly and is liable to splinter, arrows made of it should be varnished two or three times over. The length and weight of the arrows should be in proportion to the size of the bow; but, for youths' bows, the length is usually fixed at twenty-four inches. Some archers give the preference to arrows tapering from the feathers to the pile; others, to those sloping from the pile to the feathers; and others, again, to those arrows which are thickest in the middle: the shape, however, is quite a matter of fancy, as it is yet undecided, even among practised archers, which is the best or swiftest in flight. Arrows have three feathers affixed to them, two of which being taken from a gander are white, whilst the third is that of a gray goose; this is usually called the cock feather, and should always be set uppermost, when the arrow is on the string. Although the gray goose feathers are much esteemed, yet turkey and eagle feathers are superior to them, on account of their greater elasticity and strength. The young archer will find, when shooting with the wind, that sharp-pointed arrows are the best; and when the wind is strong and unfavourable, that blunt-headed ones are decidedly preferable. He may often find it advantageous to increase the power of his bow, and shorten the length of his arrow.

## THE QUIVER

Is usually made of tin, or leather, and should be long enough to take in the arrows up to the feather. The quiver is only worn in roving, the pouch and loop being substituted in the target-ground.



BELT AND POUCH,

BRACE,

GLOVE, GREASE BOX, AND TASSEL.

THE BRACE is made of leather, and is buckled round the arm, to preserve it from the violent stroke of the string when loosed;

and also to allow the string to glide easily along, without being hindered by the folds of the sleeve.

The **SHOOTING-GLOVE** consists of three finger-stalls attached by thongs to a leather bracelet, which buttons on the wrist. The glove should be made either of cow-hide, or horse butt leather; and as new leather spoils the shot, it should be greased before it is used, so that the string may glance easily over it.

The **BELT**, also made of cow-hide leather, has fastened to it, on the right side, a **POUCH**, shaped like a small bucket, to receive the piles or heads of the arrows, and a leather loop to keep them steady in their proper position.

The **TASSEL** is made of green worsted, and is hung on the left side of the archer; it is used to wipe the dirt off the arrows the instant they are drawn from the ground.

The **GREASE-BOX**, which should hang by the side of the tassel, may be made of any kind of fancy-wood: it is indispensable to the archer, as the grease, made of equal quantities of suet and bees'-wax well melted together, is used for rubbing on the fingers of the shooting-glove, when they become hard and dry, which is a great hindrance to the rapid loosing of the string.

#### THE TARGET.

THE face of the target is made of canvas, strained on a flat circular surface of bass, made of straw, like a common bee-hive. On the canvas facing are painted four circles, surrounding a golden centre or eye: the first circle close to the eye, is red; the next, white, usually denominated the "inner white;" the third, black; and the fourth, another or "outer white;" the outside verge or petticoat of the target is usually painted green. A certain value is attached to each circle of the target, generally, computed thus: outer white, 1,—black, 3,—inner white, 5,—red, 7,—and the gold eye, 9: their real value, however, according to the space occupied by each circle on the target, differs materially from the above estimate: for by this method of reckoning, the gold is valued at 9,—the red circle, 3,—inner white, 2,—black, 1½,—and outer white, 1: the game may be counted either according to the hits on the target, without reference to its circles; or according to a certain value, assigned to the divisions, by the players, beforehand. The proper mode of keeping an account of the game is, to have a card divided in the following manner, in which the hits of the several archers should be pricked to their respective names, either with a pin or a needle, termed a **pricker**.

| NAMES. | GOLD.<br>9 | RED.<br>7 | INNER<br>WHITE.<br>5 | BLACK. | OUTER<br>WHITE. | TOTAL<br>HITS. | VALUE<br>OF. |
|--------|------------|-----------|----------------------|--------|-----------------|----------------|--------------|
| A.     |            |           |                      |        |                 |                |              |
| B.     |            |           |                      |        |                 |                |              |
| C.     |            |           |                      |        |                 |                |              |

The size of the targets must always be in proportion to the skill of the archer, and the distance from which they are to be shot at. There should always be a pair of targets in the field, as shooting from one to the other shortens the walk, and consequently lessens the fatigue considerably. Targets made of milled board, although not half so durable, are often substituted for those already described, especially where it is not convenient to keep them fixed, as they are far more portable. The learner should not commence archery by practising at distant marks: ten or fifteen yards, as a beginning, will be found the best range; and it may be increased by degrees, when some proficiency is attained, to sixty yards, which is usually considered the key to all other distances: by thus gradually practising, the archer's eye and hand will be so well drilled, and become so steady, that he will scarcely ever miss the smallest mark. Much advantage may be derived from shooting at different distances, as by this practice, confidence is attained in the use of the bow, and strength in the management of it. The prizes usually shot for at targets, are, gold and silver medals, silver arrows, silver bugles, and silver cups; bows and arrows are also frequently given. Two is the usual number of prizes shot for at the target; one being for the shot nearest the centre, and the other for the greatest number of hits.

#### BUTTS.

Butts are composed of long plats of turf, piled somewhat in the form of a pyramid, and then pressed very closely together: for grown-up persons, they are usually about nine feet wide and four feet thick at the base, seven feet high, and one foot four inches wide at the top; a circular piece of thin white pasteboard, about four inches in diameter, should be placed exactly in the middle as a mark, and fastened to the butt by a peg driven through its centre. Some archers prefer butts made of straw, laid first in trusses, then pressed down as tightly as possible, and the ends afterwards cut smooth: butts made in this way, from

never injuring the arrows, are better than those made of earth, and, if kept under cover, are very durable. The butts are generally placed in sets of four, and so arranged that they do not stand in the archer's way, when shooting at any of the lengths. A single end is, shooting to one mark; while a double end is, shooting to a mark, and then back again to the mark just shot from. Shots placed outside the pasteboard mark are not reckoned; and he is the winner, who places the greatest number of shots in the mark.

POSITION.



THE young archer should place himself with his left side to the target, and turn his face toward it; he must stand perfectly upright, plant his left foot in advance of his right, and hold the bow horizontally in his left hand, with the string upward; next draw an arrow from the pouch, and carry it under the string, until the pile passes about an inch on the exterior of the left side of the bow; then press on the arrow with the fore-finger of the left or bow-hand, and with the right hand slide the nock of the arrow into its proper place on the string, and hold it fast there by the middle of the first joint of the first and second fingers. The arrow being thus

placed, gradually press the bow down with the left hand, and draw the string back with the right; as you draw, keep the right elbow well up, and raise the arms so as to bring the nock of the arrow just below the ear, and then draw the arrow to the pile; be not more than a minute in taking aim before loosing the string; indeed, according to the strict rules of archery, there should be no pause whatever in these movements. In long shots, as the arrow has to take a larger curve than in target shooting, the right hand must be somewhat depressed, so that the arrow may be drawn toward the breast instead of the ear. In taking aim, the archer should keep his eye steadily fixed on his mark, and not look along the arrow, as is the practice with many archers. Dr. Roger Ascham, in his "Toxophilus," says upon this point: "some men wonder whye, in casting a man's eye at the marke, the hand should go straighte; but surely if he considered the nature of a man's eye he would not wonder at it. The eye is the very tongue wherewith witte and reason doth speake to every part of the body. This is most evident in fencing and feighting. The foot, the hande, and all wayteth upon the

eye. The eye is nothing more than a certaine windowe for witts to shoot out her head at. The chiefe cause why men cannot shute straighte is, because *they look at theyre shafte.*" The archer should stand in front of the mark he is shooting from; if his arrow fall from the string and he cannot reach it with his bow, it is considered a shot, and is pricked down as such. When the archer has shot, he should turn round to the left, and stand behind the person he is shooting with.

#### ROVING.

In shooting roving, the archers ramble over heath and field, and select, as they walk along, some object, as a tree or a bush, to aim at; and when the distances of the marks are judiciously varied, shooting at rovers is good practice for improvement. The interest of the pastime is greatly enhanced by the continual change of scene; and by many persons, roving is considered superior to all other kinds of archery. From the distance at which the marks are usually selected, the rovers are frequently obliged to shoot at great heights, and are thus compelled to draw the bow more toward the shoulder than in target-shooting; they also learn to draw a much stronger bow than is necessary in the latter method, and they measure distances with extreme accuracy. Every archer ought to provide himself with, at least, a dozen arrows, in these excursions, and they should be heavier and longer than those used for other kinds of shooting; blunt-headed arrows are best for roving, as from the force with which they are sent, if the piles were sharp, they would be likely to penetrate so far into the mark, that it would be almost impossible to extricate them. If an arrow should become thus fixed, cut away the wood round it, rather than spoil it by violently trying to pull it out.

#### CLOUT-SHOOTING.

In this method, the target is a small piece of pasteboard about a foot in diameter, fastened on a stick, and generally fixed in the ground, about one hundred and fifty yards from the archer; and as the mark is so small, every arrow that falls within two or three bows' length of it is reckoned toward the game, which is seven. This mode of shooting is useful when a regular target-field cannot be obtained, as the marks can be fixed on any common or field. The practice is as good as target-shooting, and the trouble of carrying the mark inconsiderable.

#### FLIGHT-SHOOTING.

Flight-shooting takes its name from the flight or light arrows used in the sport, and is practised without regard either to aim or any particular distance. It is very apt to fracture the bow,

and from its requiring neither skill nor judgment, is not good practice. The archer who can send his arrows farthest, wins the game, which is seven.

HINTS ON PRACTICE.

In learning archery, never begin with a bow too strong for you; for by attempting to draw it, you may so overstrain yourself, that you will be compelled to discontinue the exercise. It is not only hurtful to the body to use a powerful bow at first, but it affects the progress of the learner; for it is impossible to attain that skill and freedom in the use of the bow, which could otherwise be attained by using a moderately powerful one in the early attempts.

It is unnecessary to unstring the bow after every shot, although many archers recommend the practice.

Never use another person's bow, for if you should happen to break it, the loss to the owner may be irreparable.

There should be no talking at the time of shooting.

Never draw a bow when a person stands before you, lest it should snap; the person bending the bow rarely suffers from such accidents, as the pieces mostly fly forward.

If the arrow fall upon the edge of the circle, it must be counted as being in that which has the greater part; but if exactly in the centre of the division, it must be reckoned in the outer circle.

Elevation is a point of archery which should be particularly attended to: if it be too low, the arrow will fly short of the mark; and if too high, it will fly over it. If the mark be at a moderate distance, the lower the elevation can be made the more certain will be the shot. According to the modern practice, if the mark be thirty yards off, it is proper to shoot point blank at it; but if beyond that distance, with some degree of elevation.

Some archers make an allowance for the wind: that is, they shoot wide on that side on which the wind lies, so that the wind may carry the arrow to the mark; however, the young archer should not trust to this plan, as it is deceptive. Standing in the wind, and shooting through it, is far better, and more certain.

In closing this sketch of the art of archery, we must impress upon our readers that nothing but a steady and earnest practice of the rules laid down for their guidance, can make them skilful archers; for without diligent practice, the most laboured instructions, and elaborately written treatises, would be entirely thrown away.

Sound, sound the music, sound it,  
Let hills and rocks rebound it,

In praise of Archery.

Used as a game it pleases,  
The mind to joy it raises,  
And throws off all diseases

Of lazy luxury.

ALLAN RAMSAY.



## FENCING.



The foiled assassin instantly took off his mask, and begged Crichton to spare his life, exclaiming that he was his pupil, Vincenzo.

PAGE 135.

**FENCING** consists in the proper and graceful use of the modern small-sword or rapier; and since the invention of this elegant weapon, fencing has been a characteristic of a gentleman's education. There is no exercise more conducive to health: in its practice, the positions of the body have for their object erectness, firmness, and balance; and the chest, neck, and shoulders are so placed as to be most beneficial to health. These considerations, combined with the graceful movements which it establishes, render the art a most desirable accomplishment, as well as amusement; and accordingly, it is now considerably practised in England.

Of course, we have but to speak of Fencing as a pacific pastime; but the subject of the preceding illustration carries us back to times when the use of the sword was cultivated in the revolting

(134)

practice of duelling. By universal consent, the Italians were the ablest masters of fence in Europe — a reputation to which they seem still entitled. Probably the best British swordsman on record is the Admirable Crichton, who had studied the sword from his youth, and improved himself in its use in Italy. Yet, he fell by this weapon, as our engraving illustrates. Crichton was one of the most learned and skilful men of the sixteenth century; and his talents, whether displayed in disputing with learned men in the colleges, breaking lances in the gay tournament, or proving victorious with the small-sword, were equally conspicuous. He was born in Scotland in the year 1551, and showed such early literary proficiency, that he was made a Master of Arts when only fourteen years of age. He travelled on the Continent, and there surpassed all who opposed him, as well in learning as in feats of military prowess. In 1582, he held a solemn disputation before the university of Padua, and maintained the contest for six hours, arguing with the most erudite professors. At Mantua, he killed in a duel one of the most expert swordsmen in Europe, who had himself killed three of the best fencers in the city. Soon after this, Crichton was appointed by the Duke of Mantua to be preceptor to his son, Vincenzo Gonzaga. One night, during the carnival, as he was proceeding leisurely along, playing upon his guitar, he was suddenly attacked by six men wearing masks; throwing down his instrument, he drew his rapier and stood on the defensive, and that with such ability, that he speedily killed or put to flight all but the leader, whom he disarmed. The foiled assassin instantly took off his mask, and begged Crichton to spare his life, exclaiming that he was his pupil, Vincenzo; Crichton recognised him immediately, fell down on his knees, and told him he was sorry for his mistake; but that he had done no more than stand in his own defence, and that if he had any wish to take his life, he might always be master of it; he then took his sword by the point, and presented it to the young noble, who being either excited with wine, or chafed at the defeat he and his hired bravoës had sustained, took the weapon, and ran Crichton through the body.

#### THE FOIL.

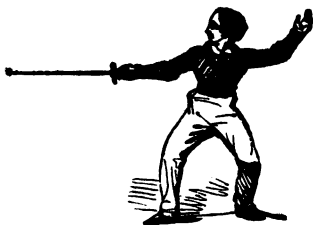
FENCING is learnt with foils, which are quadrangular blades of steel, thirty-one inches in length, fastened into plain handles, and tipped at the point with a brass button; the blade from the hilt to the middle, is termed the *fort*; and from the middle to the point, the *foible*. The fencer, to protect his face from any accidental thrust, should wear an iron wire mask, which should be tolerably stout. It is a good plan to wear a glove on the right hand, padded on the back and fingers; and in academies, a piece of

cloth, shaped like a heart, is generally placed on the left breast of the waistcoat. The fencer's dress should be very easy, so as not to obstruct his movements.

#### TO HOLD THE FOIL.

GRASP the hilt flat in your hand, so that the edges be nearly horizontal; the thumb being stretched along the upper part of the hilt, to within about half an inch of the shell, and the pommel resting under the wrist.

#### THE GUARD.



For the first position, place your right heel close to the middle of the left foot, draw your foil, as if from its sheath, and instantly place the point directly opposite to your adversary's breast; keeping the arm rather bent, and the wrist, with the nails turned upward, somewhat lower than the point of the foil; and at the same time, raise the left arm gracefully and freely. Next, bend both knees, until the left knee covers the foot, when you must advance the right foot, still keeping it in a line with the left heel, into the second position of the guard, as shown in the annexed figure. In all movements keep your eye fixed on the *wrist* of your opponent, and not on his *eyes*. Whilst making these

introductory movements, it is proper to keep out of the reach of your opponent's blade, in order to prevent surprise.

#### THE APPEL.

THE appel is made by smartly stamping twice with the right foot, taking care that the body be perfectly steady, and that the

button of the foil does not swerve out of the direction in which it was at first pointed; practise this movement very often until you can execute it with freedom, and until your position on guard is firm and correct.

#### ADVANCING AND RETREATING.

In advancing, move the right foot about eight or ten inches forward, in a straight line with the left foot; then bring the latter after it, so as always to keep in the position of the guard. In retreating, these movements are of course reversed; the left foot must be drawn back, and the right follow it, yet still keeping in the position of the guard. In making both these movements, short steps should be taken, especially when advancing; as you then get within the reach of your opponent's weapon, and must therefore act cautiously, and keep in such a position that you can parry a sudden thrust, or make an attack, if an opportunity present itself.

#### THE LONGE.



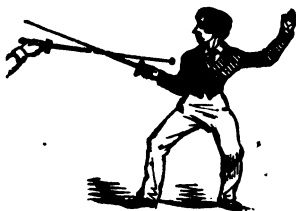
THE longe being one of the principal movements, you should steadily drill yourself in it until you can perform it with celerity and exactness. To do this, elevate your right hand, the nails upward, and

keep the point of the foil directed to your opponent's breast; allow your left hand to drop about six inches from the left thigh, the hand open and turned outward, and next straighten the left knee, so as to throw the body forward on the right foot. This movement, which is called the *extension*, being thus completed, the right foot should be advanced forward, as far toward your antagonist as possible; keeping in the following position—the right foot planted firmly on the ground, in a direct line from your own left heel to your opponent's left foot; the body upright, bearing equally on both legs; the shoulders straight, the right thigh nearly horizontal with the ground, and the leg—from the knee—quite perpendicular, as shown in the engraving. If your foot be too far advanced, or your knee overhang the foot,

you have either not longed sufficiently, or too much; and you will not be enabled to recover yourself with that adroitness which is requisite for defence from any return. In order to recover from the *longe*, it is only necessary to bend the left knee and at the same moment lift the left arm into the same position as when on your guard; next, raise the right foot from the ground, and throw your body back on the left leg; and as you perform this movement, without altering the situation of the point of the foil, drop your wrist to its former position, put the right foot firmly down, without moving your body, and place yourself on guard. During these movements, carefully keep your foil's point in a straight line with your opponent's breast. *Longeing* and recovering should be often practised, in order to acquire them thoroughly.

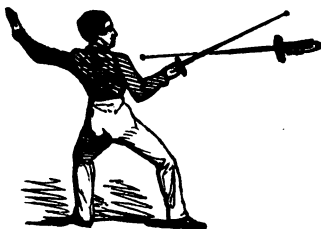
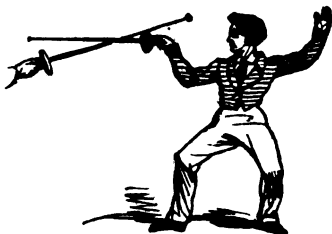
#### PARADES,

In fencing, are three divisions of the body, distinguished thus: over the arm, or outside of the blade; inside of the arm, or within the blade; and, under the arm. By the first of these terms, is meant the whole of the body above the sword-arm, between the shoulder and the sword; by the second, the space between the blade and the left arm; and by the last term, that part of the body left unguarded from the elbow to the wrist, under the sword-arm. For the defence of each of these divisions, two simple parades, of which there are altogether six, are intended. These six parades are called *quarte*, *tierce*, *circle*, *octave*, *prime*, and *quinte*; there are also two round, or counter parades, in *quarte* and *tierce*. *Tierce* and *prime* are intended for the outside, *quarte* and *circle* for the inside, divisions of the body; and *octave* and *quinte* for the thrusts under the arm.



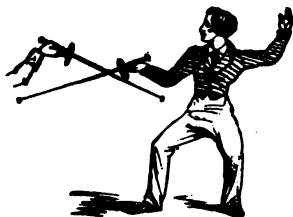
The parade of **TIERCE** is to oppose a thrust over the arm, so as to throw your adversary's point off to the right side of your body. It is performed by turning your nails downward, and opposing with the fort of your foil the foible of your antagonist's; so as to throw his blade out of the line of your body, off to the right side.

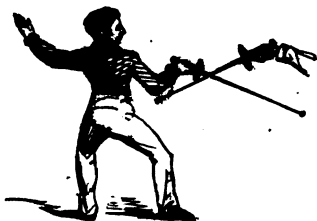
**PRIME** is employed to ward off higher thrusts, and is performed by lifting the hand to about the height of your shoulder; turning the nails downward, as in tierce, and allowing the point of the foil to drop very little below the level of the wrist, (as shown in the illustration) out of the line of your antagonist's breast, but pointed towards his right side: by this movement, your foil covers the whole of the upper part of your own body.



The parade of **QUARTE** is made by opposing the fort of your foil to the foible of your opponent's, and crossing your body with your blade, so as to throw his straight thrust completely out of the line of your body off to your left side. When performing this parade, the hand should be turned, so that the finger nails are upward.

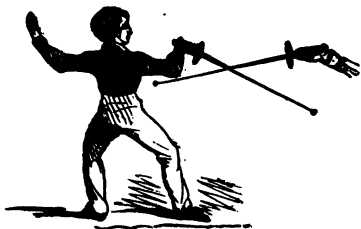
The parade of **CIRCLE** differs from that of quarte, in your wrist being higher and the point of your blade lower than your opponent's; it is, therefore, chiefly used against low thrusts. In this parade, also, the finger-nails should be turned upward.





IN OCTAVE the wrist and foil are kept in the same position as in the parade of circle; but the movement is made on the other side of the body, so as to throw off all thrusts under the arm: by comparing the annexed figures, the difference of the movements will be readily understood.

The parade of QUINTE is made from the position of prime, by dropping the point of the foil, so as to cover the body under the arm, by throwing the point of your antagonist's blade out towards the right side; you must keep your wrist in the same position as in



prime, except that the thumb must be brought under the hand, with the nails turned outward. The COUNTER or ROUND PARADE OF QUARTE is made from the engagement of quarte, when your adversary disengages to the outside of your arm: it is nothing more than performing a small circular motion round his foil, and resuming your former position of quarte; but it may be used against any of the outside thrusts. The COUNTER IN TIERCE is performed in the same manner, and is used to all attacks within the arm. When you purpose making a quick return, after your adversary has made an attack, before he can recover his guard, you must make your parades with a sharp, sudden jerk from the wrist, so as to throw his blade quite out of the line of your body. If, however, you intend to make any feint, after performing the parade, in making the parade merely oppose your foil to your antagonist's, so gently that the blades do not quit each other, keeping your point in a line with his body, until he comes again on guard; and then begin your feint. It being imperatively necessary in parrying, that the fort of your foil be opposed to the foible of your opponent's, you must take especial care of the position of your arm with respect

to the proximity of his blade to your body, when the weapons cross; for, if his blade come within a few inches of your body before you can perform the parade, you must draw back your arm, so as to enable your blade to have its full effect, and prevent him touching you; but if your opponent be so far from you that you can perform the parade properly, with the arm outstretched, it is correct to do so.

#### STRAIGHT THRUSTS, DISENGAGEMENTS, &c.

WHEN your opponent, from his attitude on guard, leaves that side of the body on which you joined blades, much exposed, a STRAIGHT THRUST is often used as an attack. When such an opportunity offers itself, quickly lift up your wrist, so as to bring the fort of your blade to the foible of your opponent's and instantly longe at his breast; preserving, at the same time, a proper opposition. A straight thrust is also sometimes used as a return; and in making this movement, after parrying your antagonist's attack, with a quick jerk from the wrist, you should deliver your return, smartly, with an extension, before he has time to recover his guard, or get his foil into line. When you can hit your opponent whilst he is on his longe, you should do it with the extension only.

DISENGAGEMENTS are performed by passing your foil under your opponent's wrist, as he stands on guard. In the parades of circle, octave, and quinte, the point of his foil being lower than his wrist, your disengagements must then, of course, be over the wrist.

The CUT OVER THE POINT is another method of disengaging, and is commonly performed as a return upon your adversary's pressing your blade as he recovers. It is thus executed: if you make it from quarte to tierce, raise the point of your foil very rapidly, by an upward motion of your wrist—above that of your opponent's, without altering the position of your arm; from the line of direction, form your extension, and instantly deliver the thrust in quarte over the arm.

When the blades are joined in quarte, the FLANCONNADE is begun. It is performed thus: your wrist should be drawn in so far toward your body, that you can with facility oppose the fort of your foil to the foible of your opponent's; then, from that position, quickly bind your blade over his, and next, without moving it, bring your point into a line with your body, and longe, keeping exactly in opposition: the longe is thus in octave. As an attack, flanconnade is used against an antagonist, who being in his reach much longer than you are yourself, opposes a straight thrust to any longe you may make; which mode, although incorrect fencing, would answer his intentions, from



the superiority of his reach, if you allowed your foil to quit his, in order to make an attack. After the parade of quarte, if your adversary do not recover immediately, but bears on your foil while on the longe, or when he recovers with his arm extended, and his point in line, then *flanconnade* should be used; as it would be hazardous to quit his foil to perform a *riposte*. After the parade of circle is performed, when your opponent continues on his longe, or recovers, having his arm stretched out, and the point of his foil lower than his wrist, you may bind your blade over his, by placing your *fort* to his *foible*; and force it, without quitting it, in such a manner that you can bring the point into a line with his body on the outside of his arm; and then thrust boldly home, making your opposition on the outside. Another method of binding the blade is performed after the parade of prime: having made the parade, on your adversary giving you full power over his foil, and leaving his body unguarded on the outside, turn your wrist from the position of prime to that of quarte; and by bringing your point into a line with his body over the arm, you make your opposition on the outside, and bind his blade.

By the term "opposition," in fencing, is meant the act of shielding your own body on the side at which you deliver a thrust: this is done by so carefully opposing your trusty foil to that of your adversary, that you throw his point quite out of the line of your breast.

#### FEINTS.

ALL kinds of thrusts, strictly speaking, come under the head of feints, as in these attacks it is the fencer's aim to deceive his opponent; but for convenience, we have followed the plan adopted by Mr. Roland,\* and arranged straight thrusts, disengagements, and bindings of the blade, in a separate division.

The feint one, two, is performed thus: when your foil is joined to your opponent's, within the arm, if he has not covered his body properly on that side, by a gentle motion make him believe that you intend attacking inside the arm. In order to cover himself, he will then be compelled to assume the correct position; upon which you must disengage, instantly, to the opposite side of his foil, making the extension at the same time. Your adversary will, probably, imagine this feint to be meant for a thrust on the outside, and will very possibly try to make the parade of tierce; some parade he must make, otherwise you would finish the longe on the same side; when he turns his wrist to form that parade, disengage again under his wrist, and longe quickly and

---

\* "Introductory Course of Fencing," page 30.

correctly within his arm, taking care that his blade do not meet yours on the parade of tierce. This feint is performed from the engagement of tierce, by making the first disengagement inside; and when this is opposed by the parade of quarte, you must instantly make another disengagement, and longe quickly on the outside, keeping clear of your antagonist's foil in the parade of quarte. When you make the feint one, two, from the position of circle, in which the point of the foil is held lower than the wrists, you delude octave; and from octave, you deceive circle.

The cut and disengage resembles one, two, with the difference that the first disengagement of the feint is made as a cut over the point of your opponent's foil. In this attack, your adversary's point should be higher than his hand, when you begin the feint.

The feinte seconde used as a return after the parades of prime, tierce, or quinte, also resembles one, two: in this, the first movement of the feint should be pointed under your opponent's arm, holding your hand as in tierce; and when he answers by a movement in quinte or octave, rapidly turn your wrist to quarte, as you disengage, and longe over his arm.

The feint one, two, three, is performed on either side of the foil, in much the same manner as one, two; the difference being that one more disengagement is made in the former than in the latter.

Doubling is used to deceive your antagonist's counter or round parades, and one, two; cut and disengage, one, two, three, the simple parades; it is begun from either side of the foil, when your adversary leaves an opening, thus: from an inside position, disengage and perform an extension over your antagonist's arm; as he, with the counter in quarte, endeavours to ward off this apparent thrust, you should a second time disengage round his wrist, to the outside, and longe. From an outside engagement of the blades, this feint is made on the same principles as from the inside.

The parades being susceptible of an infinite number of combinations, the fencer should be enabled to combine the above feints, to meet the simple and counter parades which are frequently joined in defence.

#### TIME THRUSTS IN OPPOSITION.

THESE thrusts require great judgment and skill, as all your movements must be made at the exact instant of time at which your opponent makes his attack. When you take time thrusts in opposition, (that is, when the blades cross each other,) it is essentially necessary that you fully understand what attack your adversary intends to make upon you; as you must make the various parades he wishes to deceive, and take the time thrust

upon his last disengagement and longe. There are two *time* thrusts in opposition, i. e. the time over the arm, and the time in octave. The first of these is applied to all kinds of thrusts where the longe is performed on the outside; and the second is used when the longe is made to the inside of the body, or under the arm. Thus, all thrusts yield an opportunity for the performance of these two motions. When your opponent's disengagement has ended inside the arm, your time movement will be only crossing his foil in quarte, and then continuing the same motion, dropping your point to octave; when the thrust ends under the arm, you must oppose your fort to his foible, and keep in the position of octave. When the attack terminates by a thrust over the arm, the *outside* time thrust should be performed. On a simple disengagement from the inside, the time thrust is thus made; when your opponent quits your foil to make an attack, you must instantly alter your position from the in to the outside, and keep your hand in quarte; as he finishes his attack, without altering the position of your wrist, oppose the fort of your foil to the foible of his, preserving your point in a line with his body over the arm; if, therefore, he make his thrust well home, to compel him to longe upon your point, it is only necessary for you to extend your arm and keep your position. In this manner, all time thrusts are taken, presupposing that the preparatory feints are correctly answered: if, for example, your opponent try to make the feint one, two, three, on the outside, you should return his feint *one* by the parade of quarte, and upon his second movement, take your *time* thrust over the arm; if he endeavour to double from the outside, which movement you parry with the counter in tierce on his first disengagement, and he avoids that by doubling, as he makes the last movement,—you take the *time* in octave.

Time thrusts are decidedly the most scientific motions in fencing: they require much calculation and thought as to the proper time for taking them, and also great precision in their execution; generally speaking, time thrusts in opposition require only an extension of the arm and body; but if your opponent make his attack at too great a distance, then you will find a longe necessary, which you must make at the instant he executes his thrust. Both persons thus longe at the same moment; but, your opposition should be so correctly made that your adversary's foil should be thrust out of the line of your breast, and your own point take its full intended effect on his body.

#### TIME THRUSTS OUT OF OPPOSITION.

WHEN your antagonist makes incorrect movements, disengages too frequently whilst executing his feints, attacks too widely, or

carelessly exposes himself by giving unnecessary openings,—then the TIME THRUSTS OUT OF OPPOSITION should be employed. In making them, a *longe* is always essential, as they must be executed during your adversary's feints, and not upon the last disengagement, as in the thrusts in opposition.

As these thrusts are only practised against irregular attacks, we merely give a few general rules for them: if your opponent advance when making a feint, in which he quits your blade, he at once exposes himself to this thrust, which you should use at the exact instant he comes forward; else it would be a hazardous attempt, and, of course, ought not to be made. If your antagonist quit your blade after parrying one of your attacks in order to execute a feint before you can recover your guard, by way of retaliation for your attack, he leaves an opening for you to employ a time thrust. Indeed, this thrust may be used in all wide or incorrect attacks, where the point of your adversary's foil is so far out of the line of your body, that there is no fear of a touch by it in the way of exchange; if otherwise, it would not be worth while to make the experiment. If the point of your opponent's foil touch you whilst you are executing a time thrust, (whether it be in or out of opposition), your movements must have been extremely ill-timed, or performed in a slovenly style; and although both thrusts may take effect, only that of your opponent, according to the strict rules of fencing, can be accounted good.

#### QUARTE AND TIERCE, &C.

QUARTE and tierce, counters, and *longeing*, at all feints, are exercises intended to place the tyro in fencing well on his feet, to teach him to measure his distances with accuracy, and to make his movements in the proper order of succession. In *quarte* and *tierce*, you measure your distance by making a full *longe* at your adversary's left side, after which you should both perform a short salute thus; you must place yourself on guard, engage your opponent's blade on the outside, and request him by way of compliment to make a thrust at you; then lower the point of your foil by turning your nails downward with a circular movement, and draw your right foot up behind your left. Next raise your right arm, and, with the left hand take your cap off with as much grace and elegance as you can; then perform a circular movement with your wrist with the nails upward, while you plant your right foot forward, making the proper extension. Your antagonist must perform the same movements, keeping exact time with you; making, however, a complete *longe*, instead of the extension, as if he intended thrusting *quarte* inside: his point, therefore, is presented at a little distance from your body, while you remain uncovered on the extension.

After this salute he makes about a dozen disengagements, which you parry alternately with quarte and tierce.

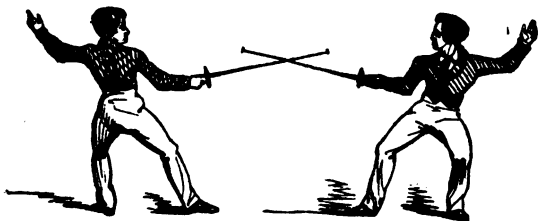
When your antagonist recovers his position, after making the *longe*, you also recover by drawing your right foot close up to the left; keeping your right hand well stretched forward, and the left raised in a semicircular sweep, as if on guard, with the hat held therein, head erect, and the hams stretched out. Your opponent being also on guard with his point out of the line of your body, and his breast unprotected by it, you take your distance; the salute is repeated, and you attack while he defends. When you in turn push, the salute differs in one respect from that described above; in that, instead of making the extension and uncovering the body, you make the complete *longe* from the first position of the right foot behind in quarte, then recover to the second position by bringing the right heel close to the left, and finish by performing the other movements. It is the person *longeing* who determines when the practice is to conclude.

If, after making these movements, you attempt an assault, you should take your masks, and holding them in the left hand, perform the fencing salute, thus: on the engagement of tierce, make two smart appels with the right foot, then bring it close up behind the left, and at the same time raise and stretch your right arm, with the nails upward, and drop the point of your foil, holding the mask in the left hand stretched down near the flank. Next, make a circular motion of the wrist, as if forming the counter in tierce; throw your left foot backward to the distance of your common guard, raise your left hand, and make two other appels; then bring your left foot forward to its former place, before the right, stretch your arm, with the nails upward, as before, and gracefully perform the parades of quarte and tierce; make a circular motion with the wrist, advance the right foot to your original guard, and put on your mask. The movements in this salute must be performed with more sprightliness than in the one before quarte and tierce, and the most exact time should be kept with your adversary's actions.

COUNTERS is an exercise restricted to the fencing-room, being only for mutual instruction. It is commenced without a salute, by your adversary and yourself taking your positions on guard, with the foils joined in quarte; bear his point out of the line of your body, when he will disengage and *longe* over your arm, which thrust you must parry by the counter in quarte, and keep well in your position; after remaining on the *longe* for a short time, your opponent will recover his guard, and in doing so, throw your foil out of the line of his body; you then instantly perform a disengagement, and this movement he must parry by the counter in quarte: you continue thus parrying and disengaging alternately, with your opponent, until you can execute the movements

correctly. After making several alternate disengagements, you may deceive the counter in quarte, by doubling on your opponent, without giving him notice of your intention; he having missed the blade in the counter to quarte, will follow it to the parade of tierce; from this parade, when you press his foil out of the line of tierce, he disengages to the inside; this you must parry by the parade of quarte, which will bring your blades to the right position for continuing the practice. The counters can also be commenced from the engagement of tierce, according to the same rules.

**ALL FEINTS** is another preparatory exercise practised before making the assault. This consists in one party keeping on the position of guard, and defending himself from the attacks of his antagonist, who is not allowed to repeat any thrust on the longe, but must recover after every such longe. The person standing on guard must not make any return.



#### THE ASSAULT.

When you enter upon the assault, pay great attention to the best method of getting into position on guard, as you may have an antagonist to contend with, who is ever ready to take advantage of all openings: it is, therefore, perhaps, better that he should take his position first, so that you may engage his blade out of measure in quarte, and thus prepare your defence before you come on guard. In taking your position, always endeavour to command on either engagement the foible of your antagonist's foil with the fort of your own; as by so doing, you press his point out of the line of your body, and thereby uncover his body as much as you cover, or guard, your own; this advantage, added to the power your fort has over his foible, will most probably allow you to deliver a straight thrust, which, as you are not necessitated to quit his blade while performing it, is one of the best attacks in fencing. If you are beyond the range of your

adversary's *longe*, the command you possess over his foil will compel him to make an alteration in your relative positions, before he tries to get within distance, and this motion will probably allow you to make an attack; but if he should advance without altering your position, you must then make your straight thrust on his advance. It is of great importance to make straight thrusts, and simple disengagements frequently; for, unless you sometimes use simple thrusts as attacks, your antagonist will not answer them when you employ them as feints, since he will quickly see that they are intended only as such. These instructions should be very carefully attended to, when you fence with a stranger, whose mode of defence or favourite attacks you are unacquainted with.

A few simple lessons will explain the method of attack and defence; we therefore add them. When the blades are joined on the inside, A. presses the blade to cover his body, on which B. disengages over the arm; A. parries this disengagement by tierce, and immediately thrusts *seconde* with an extension,—these thrusts made only with the extension, should be performed before the opponent can recover after his attack,—and B. as quickly defends himself from this thrust in *seconde*, by performing the parades either of octave or *quinte*, as he is recovering. When the blades are joined on the outside, A. presses the blade, and B. disengages to the inside; A. parries by *quarte*, making it with a rapid movement of the wrist, and instantly returns a straight thrust, with an extension, which B. recovering from instantly, parries by the parade of *quarte*. From the inside, A. makes feint one, two, when B. parries the thrust by simple *quarte*; and as the former recovers, pressing B.'s foil out of the line, the latter makes the cut over the point, on which A. executes feint one, two, three; B. parries the thrust with tierce, and as A. recovers, makes feint *seconde*; A. disengages over the arm, B. parries with the counter in *quarte*; A. doubles over the arm, B. parries that with tierce, and when A. recovers, makes feint *seconde*. A. then doubles and returns inside, which B. parries by *quarte*, and as A. recovers, throwing B.'s foil out of the line; the latter cuts over the point, and instantly disengages. The three latter movements may be used from the outside engagements also; the defending party using the necessary parades and *ripostes*, which, of course, differ from those we have just described.

If A. endeavour to change the engagement from the outside to the inside, on *quarte*, B. must disengage to the outside, while A. is bringing his foil to *quarte*. A. then retreats, on which B. advances, keeping his wrist low; and at that precise moment, A. seizes the foible of B.'s blade with the fort of his own, and *longes* straight over his arm. Whenever your opponent endeavours to change the engagement, from either the outside or the

inside, it will give you an excellent opportunity for using any of the preceding feints. When A. changes the engagement inside from quarte to tierce, and retreats a step, keeping his point well in line, B, in trying to take advantage, will afford him several opportunities of making an attack: thus, if B. step forward to regain his distance, and yet allow A. to keep his advantage of position, A. must catch with the fort of his weapon the foible of B.'s, and by elevating his wrist, longe straight over the arm; or if B., endeavouring to change from tierce to quarte, strive to regain his former position, A. will have an admirable opening for commencing the feint one, two, on the inside; but he must take the exact time, else he will lose all the advantage of it. When retreating and changing the engagement from tierce to quarte, similar opportunities of attack will occur. If B, however, can penetrate A.'s designs in thus shifting his position, he may oppose and turn the movements to his own advantage, thus: When the blades are joined on the outside, on A.'s retreating, B. must advance, keeping his wrist low; A. then advances, and longes straight over the arm; this move B. parries by prime, or high tierce, and quietly returns in seconde. If the blades be joined on the inside, on A.'s presenting his point to B.'s breast, as he advances, B. presses it out of line in quarte, so as to make an opening for A. to make feint one, two, inside; and, as he does so, B. watches the last disengagement and executes a time thrust in octave.\*

#### DISARMING.

DISARMING is a trick, which no person who wishes to be considered a complete fencer, should attempt to perform; indeed, it is a manœuvre only adapted for the foils; for, if a person were engaged in a serious encounter, he would take the precaution to fasten the sword-knot firmly round his wrist, and of course, all attempts to disarm him would then be rendered abortive.

#### CONCLUDING OBSERVATIONS.

As our limits forbid us to give more than a very brief and general, yet we trust explicit, sketch of this noble art, we now beg our reader's careful perusal of a few parting remarks. Hits are reckoned good on the right side *only*, from the waistband to the neck; on the right arm, they are not allowed. It may, at first sight, appear singular that thrusts should be confined to so small a portion of the body, as it is equally vulnerable throughout; but the regulation has, doubtless, been formed to make it

---

\* For the above modes of Attack and Defence, and for several other details, we are mainly indebted to the exceedingly clever and well-written "Introductory Course of Fencing," by Mr. Roland, the celebrated fencing-master of Edinburgh.



imperatively necessary to use great skill in handling the weapons, and in fixing the points. When both parties accidentally make mutual thrusts, or as they are termed, "coups fourrés," they are not reckoned good, unless one fails in fixing his point; and in that case, the one taking effect is counted. If your opponent, when you make an attack, find that he is unable to ward off your thrust, and so intentionally makes a mutual thrust, then his movement must not be reckoned, even if your point do not take effect. If you happen to make a thrust directly after your adversary has lost the grasp of his foil, it is reckoned a fair hit; but if you perceived his misfortune before you delivered your thrust, then it is a dishonourable and unfair hit, and of course cannot be counted. It is unfair to employ the left hand as a cover to the right side of the body, or for parrying a thrust; and this is not permitted in assaults. Always endeavour to penetrate into all your opponent's plans, both of attack and defence, and form yours accordingly; since fencing does not so much require dexterity of movement as a complete knowledge of all the resources of the art, and the best method of employing them. In the assault, the feel of the blade is of more importance than quickness of sight; for by it the fencer can ascertain whether his adversary is about to attack, and also on what parade he purposes answering the first movements of the feints. Quickness of sight is, doubtless, extremely advantageous to the fencer, and not to be thought lightly of; but, both it and the feel of the blade are inferior to a correct and decided judgment in point of utility. Vary your parades as much as possible, so that your opponent may not ascertain your favourites; for, even if you are a good fencer, and you frequently use one parade in preference to another, you may be defeated with more ease than you would probably like to acknowledge.

At all times, perform your fencing exercises with precision and gracefulness, and never behave harshly to your opponent; neither exhibit angry feelings when you are vanquished, for your defeat may, in all probability, be ascribed to your own negligence, and not to any superiority in point of skill on the part of your antagonist; nor, when victorious, show your joy by exulting over your crest-fallen opponent, but remember that you should "always do unto others as you would they should do unto you," and that forbearance to the conquered is not the proof of a weak, but of a noble mind.



## RIDING.



A very riband in the cap of youth,  
Yet needful too.

SHAKESPEARE.

The riders bend  
O'er their arched necks, with steady hand by turns  
Indulge their speed, or moderate their rage.

SOMERVILLE.

RIDING on horseback is generally allowed to be one of the most cheerful and enlivening of all exercises, whether for youth or manhood; and we trust that the following little treatise upon the art will prove useful as well as interesting to every boy who has it in his power, or, at least, can contrive, to mount a nag.

### MOUNTING.

In mounting, the rider should place himself somewhat in advance of the horse's shoulder, and turn his left side to it; he



must hold his whip in his left hand, take hold of the centre of the snaffle reins with his right hand, and pass the middle finger of his left hand through them, from before, keeping the back of that hand toward the horse's head. He should next place his left hand on the animal's neck, about a foot from the

saddle, with his right hand draw the reins through his left; and shorten them until he has an equal feeling, with the latter hand, on the horse's neck; then with his right hand he should throw the end of the reins to the off-side; with the same hand, he must next take a lock of the mane, and twist it round his left thumb, and then close his left hand on the mane and reins. After these preliminaries, he should take hold of the left stirrup with his right hand, raise his left foot and put it in the stirrup, turn his face so as to look across the saddle, place his right hand on the cantle, press his left knee against the saddle on the girth, and keep his heels back, so as to prevent his toes touching the horse's side; he should next take a spring from his right instep, and raise himself in the stirrup, pressing his knees firmly against the saddle, and keeping his heels together, yet slightly drawn back. In this position, the body must be upright, and rather supported by his right hand; from this attitude, he should move his right hand from the cantle to the pommel, pass his right leg over the horse's quarters to the off-side, press his right knee against the saddle, and bring his body gently down into it; his right hand, of course, should next quit the saddle, and his left the mane.

The rider being thus mounted, he should hold his left or bridle hand, the wrist bent outward, opposite to, and at three inches from his body; and drop his right hand by the side of his thigh, place his right foot in the stirrup, unaided by either eye or hand, adjust his clothes, then change the whip from his left hand to his right, and hold it inclining toward the left ear of the horse. The whip should always be carried in the right hand, except when in the act of mounting or dismounting. If a groom attend at mounting, he must not be allowed to touch the reins, but merely hold that part of the bridle which comes down the cheek. In dismounting, the movements are precisely the same as in mounting, only reversed.

## THE SEAT AND BALANCE.



As the body must always be in a situation to preserve both seat and balance, we shall endeavour to make our instructions upon these heads as explicit as possible. For a firm, erect seat, the thighs, turned inward, should rest flat upon the sides of the saddle without grasping; as the weight of the rider will give sufficient hold with-

out such aid, which, in fact, only lifts the rider out of his saddle; the thighs, however, must be kept so firm that they will not roll or move, so as to disturb the horse, or loosen the rider's seat; but if the horse should hesitate to advance, they may then be slightly relaxed. The knees must be kept back, and stretched down so as to throw the thighs somewhat out of the perpendicular, but no hold or gripe should be taken with them, unless the rider has lost all other means of holding on; if the thighs be in their proper position in the saddle, the legs and arms will be turned as they should be; that is, they will be in a line parallel with the rider's body, close to the horse's side, but without touching; they may, however, sometimes give an additional aid to the seat, by a grasp with the calves, and assist the aids of the hands in like manner; the toes should be raised, and the heels depressed, and kept from galling the horse's side. The body should be held quite erect, and the shoulders kept square and thrown back; the chest advanced, and the small of the back bent rather forwards. The upper part of the arms must hang perpendicularly from the shoulders, close to the hips, and be kept steady, yet without rigidity, else they destroy the hand. The hands should be held with the wrists rounded a little outward, about four or five inches apart, in front of the body; the thumbs and knuckles pointing towards each other, and the finger-nails to the body.

The **BALANCE** in riding, preserves the body from those inclinations or swervings from side to side, which even the ordinary paces of a horse occasion: it acts and corresponds with every movement of the animal, and therefore enables the rider to sit so firmly, that nothing can shift him from his seat. To explain this very essential part of horsemanship, we may just mention, that it is for the rider when his horse is working straight and upright on

his legs, to keep his body in an upright position ; when the animal breaks into a trot, to incline his body a little back : and in the gallop, leap, or any violent action of the horse, generally to keep his body back. When the horse leans or bends, as he does when turning a corner sharply, or galloping round a circle, the rider must incline his body in the same degree, else he will lose his balance ; indeed, the art of balancing consists in implicitly yielding the body to every movement of the horse ; and to acquire it properly, the practice on circles is extremely useful, working carefully and equally to both hands. The rider should never take the least help from the reins in order to preserve his equilibrium ; for the bridle hand should always be kept fixed, and the reins held at such a length that they may support the horse, but not the rider.

#### HOLDING THE REINS.



IN holding the snaffle reins separately, one rein is held in each hand, between the third and fourth fingers, and out of it over the fore-finger, where the thumb presses it closely down : this method of holding the reins is superior to all others, especially for beginners, as a greater command is obtained over the horse by it, and the aids can be better gained, than when the reins are held in one hand only ; besides which, the rider is compelled to sit square and correctly in his saddle, and not wrung on one side, as is frequently the case with those who hold the reins in one hand only. If, however, after he has

made some progress, the learner wishes to try the method of holding the reins in the left hand, he must pass the left rein under his little finger, take the right rein under the third finger, keep them both smooth through the hand, let the end of the reins hang over the fore-finger, and close his thumb firmly upon it. When double bridles are used, it is the best plan to let the curb bridle lie loose, or be fastened by a slight knot upon the horse's neck. In adjusting the reins, that is, shortening or lengthening them, as may be found necessary, the superfluous reins which hang over the left hand should be taken in the right, and the horse's head be supported by that hand ; the left hand should then be passed up and down the reins, and thus the rider can adjust them as much as may be required. If the horse will not obey one hand, the reins must be separated by putting the three first fingers of the right hand over the snaffle rein, and

taking it between the third and little fingers; the ends of the reins being allowed to hang over the forefingers of each hand, and drop down between them.

#### THE CORRESPONDENCE.

WHEN the reins are held in the manner we have just described, at such a length, that if the hand were moved in the slightest degree it would rein the horse back, or if the least freedom were allowed to the hand, the horse feeling himself at liberty, would instantly advance—it is called the Correspondence.

If the hand be held perfectly steady, the fingers will feel, at every step the horse makes in the trot, a gentle tug at the reins; and this tug, through the correspondence, is mutually felt in the horse's mouth. This is denominated the Appuy.

So long as this connexion is kept up between the rider's hand and the mouth of the horse, the horse is completely under the control of the rider; and that so entirely, that he seems to be guided by his will rather than his hand: this is termed the Support.

Without these three operations, the correspondence, or communication between the hand and the mouth, the appuy, or power of the reins on the mouth, and the support, or aid which the hand gives in action, the horse would be under no immediate control; and, in all the manege, or united paces, they are uniformly maintained.

#### AIDS.

THE motions of the hand, body, legs, and whip, which are made use of in directing the horse, are called Aids; they are also defences to the rider by checking the horse when he displays any viciousness, or when he attempts to gain the superiority. In making use of the aids, it is essentially necessary that the movements of the hand, body and legs, should agree, as it frequently happens that the effect is lost from want of harmony in the actions. There are five positions, or aids of the hand—including the general one from which the other four proceed—employed in directing the movements of the horse: the first we have described in treating of the mode of holding the reins; the second is a slight relaxation of that position, and allows the horse to advance; the third shortens the right rein slightly, and directs the horse to the right; the fourth shortens the left rein, and turns the horse to that side; and the fifth shortens both reins, and reins the horse back, or stops him. The aids of the body are extremely simple: to aid the second position of the hand, the body should be thrown forward a little; to the third and fourth positions of the hand, a slight turn of the body to that side to which the

horse should turn ; and to the fifth position of the hand, the body should be slightly thrown backwards, so as to draw the hand gently with it.

The aids of the legs are the following : to aid the second position of the hand and compel the horse to advance, the legs should be closed ; to the third and fourth position of the hand, the leg should be pressed on that side to which the horse must turn ; and for the aid to the fifth position, the legs should be gently pressed to the sides. In making these movements, several degrees of power may be employed : pressing the side, is the gentlest motion that can be used ; placing the leg rather back, and turning out the toe, is the next ; a touch with the calf of the leg, is the third in degree ; a smart stroke with the leg, keeping the toe up firmly so as to contract the muscles, is the fourth ; and a scratch with the spur rowel, the severest ; this, however, is not resorted to, until the legs have been laid on without effect.

The aids of the whip are employed to assist those of the heel : they are slight touches given with it either on the hind quarters or the shoulders. When applied on the near side on the hind quarter, the whip is held in the fingers with the lash pointing downwards ; and when given across the bridle-hand before, it is held with the lash upward.

#### ANIMATIONS, SOOTHINGS, AND CORRECTIONS.

ANIMATIONS are given by the hand, legs, whip, and tongue ; and are used when the horse abates his speed, bears heavily and languid on his bit, or performs his paces in a slovenly manner. The animations of the hand and legs, are the movements described under the head of the aids : those of the whip are merely slight taps to urge the horse forward, or if the lash be held up upward, switching it into the air ; and the animations of the tongue consist in making a clacking noise with it ; but the latter must be employed with caution, for if given too frequently, they lose effect. As it is much easier to keep up, than to restore, the animation of a horse, it is better to use the whip, the leg, the hand, or the tongue, rather before than at the time it is absolutely necessary to resort to such means : the rider should therefore endeavour to foresee when an animation will be required, and then the slightest movement is generally sufficient. As the animations of the legs and whip threaten punishment, the least movement of the hand, body, or legs, is usually enough to incite a well-trained animal, and keep him on the alert ; while to a dull, inactive horse, whip and spur will be frequently necessary ; even these, however, potent as they are, lose their efficacy if too often applied ; the more the animations are varied, the better. A gentle movement of the fingers of the bridle hand is an excellent

animation; it keeps the horse to his duty, awakens the sensibility of his mouth, and retains the correspondence between it and the hand.

**SOOTHINGS.** In order to dispel the fears of the horse, and to encourage him, soft and calm tones of the voice, gentle patings and strokings with the hand, are employed; these are called soothings: all unnecessary restraints either of the body or legs should be relinquished, and the rider should sit with as much ease and freedom as he possibly can; indeed, the perfection of soothing consists in the rider sitting so perfectly easy, as not to add to the horse's animation, and yet so well on guard, that he can execute any of the defences in an instant, should they be required.

**CORRECTIONS.** The rider should, in correcting a horse, endeavour to work rather upon the mind than the body of the animal: those corrections which make him most obedient, and yet at the same time dishearten him the least, are not the most severe; they rather check than compel him. The corrections are made either by whip and spur, or by keeping the animal under stronger restraint. If the horse be sluggish, or will not dash off with alacrity, the rider should compel him to go sideways, sometimes to one hand, sometimes to the other, and then push forward. If he be inclined to go forward too fast, lessen the power of your aids, and make him go backward, more or less, according to the spirit he manifests. If he be inclined to dispute your authority, walk him straight forward with his head in, and croupe out. In giving corrections with the whip, the rider should do them with vigour, applying it behind the girth under the belly, or over the shoulders between the fore-legs. If the horse kick when he feels the touch of the whip on his flanks, the rider should immediately repeat it smartly; and if he rebel at that, give it still more vigorously. Some horses pay no attention to the whip, but fly at the spurs; others care not for the spurs, yet are frightened at the whip: these variations of sensitiveness, the rider must attend to, and apply the severest correction.

When the whip or spur is given two or three times to an unruly horse without effect, the rider must endeavour to find out some other means of correcting him. Astley, in his work on the management of horses, observes that "too great a degree of indulgence may induce the horse to consider that you are afraid of him; and if he should once think that you are really so, you will find he will exercise every means to convince you that he considers himself your master, instead of acknowledging, by implicit obedience, that you are his; the rider should, however, endeavour to avoid all quarrels with his horse, and use the corrections only when needful."



## VICES.

WHEN a horse is given to stumbling, rearing, kicking, bolting, plunging or shying, or restiveness, the rider must maintain his seat as directed in the leaps, and hold the reins separately, and rather short, so as by keeping the horse's head up, to hinder his kicking or rearing; the rider must keep his body upright, yet pliant, preserve his balance by his thighs, and keep his legs close to the horse's side, yet not so as to grasp until imperatively necessary. When the horse elevates his fore legs, the breech should be thrust out behind, so that the rider is prepared if he rear; and as they come to the ground, the breech should be slipped under, which enables the rider to bring his feet into a position to hold on, and second his hands in taking firm hold. It is rather singular, but certainly fortunate, that when a horse is addicted to rearing, he seldom kicks; and when given to kicking, he seldom rears. When the horse displays symptoms of viciousness, the rider should see that the saddle and girths do not irritate him; and that the bit, by being too high in his mouth, do not hurt his lips.

When the horse stumbles, the rider, by pressing his legs to the horse's flanks, and keeping his head up, may afford him instant assistance. The bridle should, therefore, be held of such a length that in case of stumbling, the rider can raise the horse's head by main strength, and the weight of his body thrown backwards. In using this aid, it is clear that if the rein be held too long, the rider must fall backward as the horse rises; and if too short, he as certainly will be pulled over the horse's head: a medium length must, therefore, be considered the most proper. By pressing the legs to the horse's side, he may be helped up the side of a bank, or compelled to keep his haunches under him when going down hill.

Rearing is the most trying of all vices, as it risks both horse and rider's falling backwards. If the horse rise straight up, the rider should yield him all the bridle, and at the same time throw his body forward; the weight of the body thus bearing on the horse's shoulders will compel him to come down; and when his feet are *nearly*, yet not *quite*, on the ground, the spurs should be applied as smartly as possible. Another method of curing a propensity to rear, is for the rider, when he is aware of the animal's inclination to try this manœuvre—to separate the reins, and as he raises, to slacken one hand, and turn him round with the other: by this plan, the horse being compelled to move one of his hind-legs, is thrown off his balance, and, of course, comes down on his fore-feet; he should then be twisted round several times, in order to prove the rider's mastery; which turning will baffle and effectually deter him from rearing to a dangerous height.

Horses inclined to kick, either when they go forward or stand still, should be held in closely; but if they do not attempt to get the full mastery over their riders, they may be allowed to go forward. If the horse strive to get his head down, which would enable him to kick so violently as to throw himself, his head must be confined close up, which deprives him of his power, and he then bolts from all-fours. The most efficacious punishment for kicking is to twist the horse round two or three times; and this being done to his weak or unguarded side, it will so astonish him, that it will be sure to check any further inclination to dispute on his part. When a horse kicks, the rider should incline his body backward.

If the horse bolt, the rider should not use one regular, continued pull, but rather make repeated tugs at the reins until the animal takes heed and obeys. Pulling each bridle alternately, generally termed "sawing the mouth," will also have the desired effect; but the rider must be on his guard lest the horse, by stopping suddenly, pitch him over his head.

When plunging, the horse gets his head down, cringes his tail between his quarters, raises his back, endeavours to burst his girths by inflating his body, and in this position kicks and plunges until he can hold his breath no longer. In endeavouring to cure him of this vice, the rider should sit firmly whilst he is plunging, and take care that the horse, in trying to get his head down, do not pull him forward. As there is no fear of the animal rearing, it is not necessary for the rider to do more than just keep his body back, and hold the horse steadily to prevent him throwing himself down.

When a horse dashes to one side, or turns short round, either through shyness or restiveness, the rider must keep his legs near the horse's sides, so as to be ready to lay hold on any sudden start: he should place all his reliance upon the security of that hold, and not on any bearing in the stirrups; and he should gently yield his body to the motions of the horse. A horse may be checked when about to spring to one side, by his rider's leg being pressed on the side he wishes to fly to, and retaining his head high and straight forward, so as to hinder his looking in the direction of the object he shied at. If the horse curvet irregularly, and writhe himself to and fro, his head must be turned to one side, or both, alternately, without letting him get out of his course, whilst the rider's leg should be pressed against the opposite side. By these methods, he will not be able to fly to one side, as the pressure of the leg will prevent that; nor to the other, as his head will be turned in that direction; and a horse never starts in the direction of the side to which he looks.

When a horse begins to grow restive, he stops, and turns short round, usually to the right, as he thereby attacks his rider on the weakest side. If this vice be not very powerfully displayed, the

best mode that can be adopted, is to push on the horse, using the whip to urge him forward; for the application of the spurs alarms a horse, and is likely to make him more restive; they should, therefore, be used only in extreme cases. If the horse be determined to resist all methods of urging him on, the rider must give it up as a hopeless task, adopt some other plan, and make the vice its own punishment: he should, therefore, turn the horse quite round, so as to bring his head again in the proper direction, and instantly apply the whip; and if he turn a second time, turn him round twice or thrice, and, before he is prepared to resist it, employ a touch of the spur to aid the whip.

It is an invariable rule, if the horse seem determined to go the wrong way, to insist upon his going the right way, and no other; and if he will not obey readily, to turn him about and rein him backward, which movement he will answer with great celerity, if not inclined to advance. In these quarrels, the rider must be quite calm, and see that his horse do not sidle up to a wall, on the pavement, or against other horses; in which case, instead of pulling the animal's head from the wall, or whatever he is sidling to, turn his head to the object, and back him completely away. If the horse stand stock-still, the rider should let him have his own way, and not make the slightest effort to urge him on; when he thus finds that it does not provoke his rider, he will speedily move of his own accord. The rider must never put himself in a passion with his horse, even if the animal be extremely obstinate; and unless the vice calls forth all his strength to overcome it, he should not show that he is at all disconcerted; by which coolness, the horse, finding that his master is thoroughly prepared for all his movements, will quail, and desist from further contention.

#### THE WALK.



WHEN the rider has shifted the whip and taken the reins properly, he should press the horse's sides with his legs, to induce him to proceed slowly forward in the walk; the reins should be held so as to support the horse's head sufficiently, otherwise his pace will be slovenly and his head low; but if his head be raised too much, it will prevent his walking freely, as it compels him to shorten his step. If he do not exert himself, he must be gently

animated ; and if he should break into a trot, he must be checked by a pull of the reins, not so strong, however, or so long continued as to cause him to stop. Turns in the walk should generally be performed slowly, and all the aids brought into requisition to produce them : as, for instance, in turning to the left, that hand should be held rather lower than the other, and by moving the little finger gently upward and toward the body, that rein will be tightened and held back, while with the right hand the outer rein is slightly slackened ; a gentle pressure with both legs should accompany these movements of the hand, in order to bear up the horse, keep him to the bridle, compel him to bring his haunches under, and obey the leading rein ; if the indications be given by the inward leg only, it will make the animal throw his haunches too much outward. In making the horse wheel on his centre, the hand and the heel work together ; the hand guides the shoulder round, and the leg leads the croupe, so that in the movement the fore feet describe one half circle, and the hind feet another. The instant the wheel is finished, the hand, body, and legs must resume their usual positions.



THE STOP is made by the rider drawing in his arms, keeping his fingers toward his body, and holding both reins uniformly and powerfully ; then, pressing for a moment his legs to the horse's sides to urge him up to the bridle, he throws his body back, and so gives full effect to the check : all these movements should be done instantaneously, and with only one motion. Should the rider not close his legs, in all likelihood the horse will not bring his haunches under ; and

the stop, by being on the shoulders, will lose its effect. If the stop be made by a gradual cessation of action, it will be slovenly ; as it will also be if the check be given in the middle of a cadence : the stop should be so timed that the horse will halt at the finish of a cadence, without breaking the previous time, and be so brisk, and well balanced on his haunches, that on the slightest indication from his rider, he would advance with the same speed as before. If the stop be made correctly, it shows the great control the rider's hand has over the horse ; it compels him to be submissive, unites him, makes his haunches pliant, and bends his houghs or lower parts of the thighs ; it should not, however, be

practised too often, as much evil may result from an injudicious use of it. Should the horse, in stopping, toss up his head, the left hand must be kept firm and low, permitting no liberty of the oridle; while the right hand must press on his neck until he brings down his nose, when in an instant all the bridle should be allowed him. If the horse will not readily answer the indications to stop, he must be compelled to go backward, by way of punishment for his obstinacy. In going backward, the horse has always one of his hind legs under his belly, on which he balances himself, while he is stepping back with the other; his head must be steady and right, and his feet should be even. In this movement, the rider should aid the horse by equally feeling both reins, bending his body a little forward, and pressing the horse's sides gently with his legs, so as to keep him well up to the bit. If the horse turn his croupe out of the line, the heel must support and direct him; for instance, if he turn his croupe to the right, the right leg must guide it into the proper line: this movement must be performed very carefully, for if the aid be given too strongly, the horse will, most probably, throw the croupe too much to the opposite side.

#### TROTTING.



IN trotting, the horse raises two feet at a time: that is, the near fore foot and the off hind foot, and vice versa; thus making only two beats instead of four, as in walking. In the trot, there is a leading foot, either the right or left, by which that side is a little more advanced than the other. The leading with either foot is extremely useful; for, if a horse unused to altering,

be obliged through fatigue or chance to change the leading leg for that which he is not accustomed to, his action will be hard, cramped, and irregular. During the trot, the rider must sit close to the saddle; and preserving his seat, not by the pressure of his knees, but by a good balance of the body—which must be slightly inclined forward—he should neither stand nor rise in his stirrup, but allow his whole figure to act in unison with the motions of the horse; and in order to preserve a proper degree of correspondence and appuy, he must keep his hands steady but pliant. If the horse trot too fast, the action should be checked by tight-

ening the hold on the reins; if too slow, he must be animated, and encouraged to put his foot out boldly; and in giving these animations the rider must support his fore-hand up, when a touch of the fingers, or an animation of the tongue, whip, or legs, will have its due effect. In road-riding, the proper pace for which is the trot, if the horse trot in a disagreeably rough manner, the rider may ease the jolting by rising slightly in his stirrups; and the quicker the horse trots, the easier it is for the rider, as he is not elevated by his own movements, but by the action of the horse. Although this is called rising in the stirrups, they are of no great importance to the rider in holding on: indeed, *no dependence* should be placed in such supports; for many persons who have relied on their footing in the stirrups, have been thrown, by the horse turning suddenly round, or shying. The arms and shoulders must not be jerked up and down through the motion of the body, for great steadiness of hand is required to preserve the due degree of correspondence with the horse's mouth; neither should the legs press his sides, as that would most likely cause him to break into a gallop, which must not be permitted; as it spoils the beauty of the action to be constantly varying from one pace to another. The directions respecting turns, stops, &c., which are inserted under the head of "the walk," hold good with regard to the same movements in the trot.

#### THE CANTER AND GALLOP.



IN the CANTER, which is the most difficult kind of gallop, the horse's feet are raised from, and come to, the ground, so as to mark a regular quick sharp time of one, two, three, four. To urge the horse into a canter, the rider should press him with his legs, or animate him with his tongue; and at the same time, slightly raise his hand to incite him to lift his fore legs: however, should he

be inclined merely to perform a quicker trot, the hands must be kept firm and the animations increased, until he moves at the desired pace. The GALLOP is an extended canter; and in both actions it is immaterial with which leg the horse leads off, provided the hind leg of the same side follows it. In galloping to the right, the horse should lead with the inward or off fore leg,

followed by the off hind leg; and in turning to the left, he must lead with the near fore and hind legs: when performed in this manner, the action is termed united; but if, on the contrary, he lead off with the off fore and near hind legs, and vice versa, he is considered disunited; and if in galloping, either to the right or left, he lead with both near or off legs, his action is reckoned false. If the horse strike off with the wrong leg, false, or disunited, the rider should, by shortening the inward rein, and applying his off leg to the horse's side, strive to make him change, and lead with the proper leg. If the animations be not kept up, and the full action be not supported by the hand, the horse will break into a trot; therefore, the moment the action is felt to be declining, it should be immediately restored by the proper animations. The stop in the gallop should be so timed, that it may be begun when the horse's fore feet are coming to the ground, or at the beginning of the cadence; and end when the horse brings his hind feet to the exact distance, and so finishes the cadence: it is useless, however, to attempt making a perfect stop, unless the horse be correct in this pace or time of his paces. The double arrêt is the stop completed in two cadences of the gallop, instead of one, and therefore is not so distressing either to the horse or his rider: at the first cadence, the body should be thrown gently back, so as to check the horse's movement in some measure, but not entirely; and the finish should be in the second cadence, the rider still keeping his body back.

#### THE STANDING LEAP.



THE moveable bar for leaping, should not be more than from one to two feet in height in first; but it may be gradually elevated as the rider perfects himself; however, it should never be very high. The leaps are taken either standing or flying: the former, although practised first, is by far the most difficult to sit; but by being taken slowly and deliberately, it affords the rider time and recollec-

tion, and the riding-master an opportunity to render assistance in case of mishaps, as well as to instruct. As its name implies, this leap is taken from a standing position, without any run before it:

when the horse is at the bar, the animations of the hand and leg will incite him to rise; and as he does so, the rider should, to preserve his perpendicular position, allow his body to come rather forward, keep his back in, and his head firm; as the horse springs forward, he should slip his breech under him, so as to let his body go readily back, and keep his legs close and body back until the animal's hind legs have come fully to the ground. The rider must press his legs, from the knee, so closely to the horse's sides, that the action of the body will not relax them; the toes should be raised so as to keep the spurs from galling the horse's sides; and if requisite, they may be turned out a little, to strengthen the hold. The position of the hands also must be particularly attended to: at the first moment of taking the leap, the rider must give the rein to the horse, without reserve; and as the horse's hind feet come to the ground, collect the reins firmly, resume his position, and proceed at a moderate pace; the hands should be kept low, and at the centre of the body, for if otherwise, they confine the horse's head, prevent the rider's body from going easily back, and also throw him forward. If the horse be too much collected, in order to incite him to rise, he will bound over the bar, and if not sufficiently so, he will perhaps not clear it: the animations necessary must be left to the judgment of the rider, as they entirely depend on the temperament of the animal.

#### THE FLYING LEAP



Is much easier than the standing leap, although the movement is quicker: it may be taken from any pace without previously halting; but a moderate pace is the best, as then the horse rises at a proper time, neither too soon nor too late. From ten to fifteen yards is the proper distance for a horse to trot before he

takes the leap: if he be well trained, he may be allowed to take his own pace to it; but if he be sluggish, he should be animated with the spur just before his head is turned toward the leap, and



pushed into a short, collected gallop. It is quite useless for the rider, when taking this leap, to bring his body forward as the horse raises his fore legs; because, the spring from the hind legs being taken instantly afterwards, if the horse checked himself, and refused to take the leap, or did not come fair, he might be thrown over the horse's head, through the forward position of his body. The rider should, therefore, hold on firmly by his legs, and keep his hands down: as the horse springs forward, his body will invariably take the proper movement of leaning back especially if he, at the moment of the spring, slip his breech under him and bring his waist forwards.

The horse requires, in this leap, little support from the hands until he comes to the ground; when the hands assist in supporting him, and in bringing the rider's body upright.

#### CONCLUDING OBSERVATIONS.

SOME writers are of opinion that boys should not be permitted to ride on horseback before they are twelve years of age, on account of the many attractions which the exercise presents, and the strength, care, and presence of mind, which it requires; yet, if lads be allowed only to dash about on their little Shetland or Norway ponies, they, in process of time, acquire a short fidgetty style, which ill adapts them to answer the bold, free action of a horse, when they happen to be perched upon one; and this bad habit is not easily got rid of.

Ponies are generally more vicious and tricky than horses; but they are capable of enduring much greater fatigue, and often perform nearly double the work, in proportion to their size.

Many ponies are never trained, but are taken and ridden in the rough: they are, consequently, not so tender in the mouth as those regularly broken in, and require rather stronger handling.

The young tyro, when he essays his skill, should endeavour to ride well: a good style is not difficult to acquire, and besides being exceedingly graceful when gained, it adds much to the enjoyment of the exercise; for a slovenly, careless, or unskilful equestrian never can truly appreciate the pleasure of a ride.

Xenophon remarks that we should endeavour to make ourselves to our horse the organ of pleasure; that we should associate with our presence the idea of absence of pain; and that nothing should be done to the horse in anger.

The horse should be fed from the hand with anything he may fancy, such as an apple or carrot, or sugar; and be made to come for it when whistled to, or called by name. When the head is loose, by throwing pieces of apple or carrot on the ground, he will learn to watch your hand like a dog, and will soon pick up your glove, or handkerchief, or whip, and bring it in exchange

for the reward ; or, when mounted, put his head back to place it in your hand. These may be all "foolish things to the wise," but nothing is useless which familiarises the horse ; which increases the confidence and intimacy between him and his rider ; or which teaches him to look to man for the indications of his will, and to obey them, whether from fear, interest, or attachment.

Riding the horse fast on hard ground, is as unhorsemanlike as it is inhuman. It is true that money will replace the poor slaves as you use them up, and if the occasion require it, they must, alas ! be used up ; still, nothing but a case of life and death can justify the deed. "If the ground be hard and even, a collected canter may be allowed ; but if hard and uneven, a moderate trot, at most. One hour's gallop on such ground would do the soundest horse irremediable mischief: those who boast of having gone such a distance in such a time, on the ground supposed, show ignorance or inhumanity."\*

\* Hints on Horsemanship.



## THE ANGLER.



GILBERT & GIBSON

In genial spring, beneath the quivering shade,  
Where cooling vapours breathe along the mead,  
The patient fisher takes his silent stand,  
Intent, his angle trembling in his hand;  
With looks unmoved, he hopes the scaly treed,  
And eyes the dancing cork and bending reed.

POPE.

I in these flowery meads would be ;  
These crystal streams should solace me,  
By whose harmonious bubbling noise  
I with my angle would rejoice.

So wrote honest old Isaack Walton ; and so *thinks* every urchin who, on-some long-wished-for half-holiday, sports his rude fishing-tackle, albeit of his own contriving, and wends his way to where

“The murmuring brooklet tells its babbling tale,  
Like a sweet under-song,”

pondering in his mind the havoc he is prepared to make amongst

(168)

the finny tribe. The most sparkling visions of success, however, often end in bitter disappointment, and the young, unskilled angler has frequently to experience a tolerable share of vexation : now watching the gaily-painted float as it rides gently upon the rippling surface of the water, obedient to all its impulses, without having the satisfaction of seeing it disappear for an instant ; now



observing risings in all parts of the stream, but where the bait holds out its delusive temptation ; now being warmed through by the sun, and anon as comfortably cooled by a smart shower of rain, he waits—a complete personification of patience—until his few brief hours of relaxation have almost waned away ; yet even this accumulated load of petty miseries disappears when a throw proves successful, and the pleasure attending it wonderfully enhances the beautiful shape and silvery colours of the prize.

Before describing the different kinds of fish, we shall offer a few observations upon the **TACKLE NECESSARY FOR ANGLING.**

#### RODS.

THE ROD being the *staff* upon which the angler's sport depends, we shall first proceed to give some particulars respecting the choice and manufacture of this essential implement. At all fishing-tackle shops, rods made of vine, bamboo, hazel, and hickory, of various lengths and fashions, may be purchased : some are made to fit into canvas bags, whilst others are so contrived as to resemble walking canes ; the former, however, are decidedly the best, being usually longer, and always better made, as the joints are more carefully fitted and adjusted together. The rod should, when put together, taper gradually from the butt-end to the top, and be perfectly straight and even. For general purposes, a rod of about twelve feet in length is the most convenient ; but in wide rivers, fifteen and eighteen feet rods are sometimes required. A

bamboo rod, with several tops, of different degrees of strength is well adapted for general purposes; and a cane rod surpasses every other for fine fishing.

If the young angler wish to turn rod manufacturer, he may use ash for the butts, and lancewood for the tops, and so make extremely good two-piece rods; or crab-tree for the stocks, with hazel or yew switches for the tops. A whalebone top is an extremely good, although not an indispensable, article; it should have a strong loop of horse-hair whipt on it. Hazel wands will be found very serviceable additions to the stock of materials; they must be cut toward the end of the year, and allowed to dry and season in the chimney during winter; and if any accident should befall a good rod, a tolerably efficient substitute may be made by sloping off the ends of three or four of these wands, and then fastening them firmly together with shoemaker's thread. It is a good plan to have a rod for each kind of fishing, as each can then be kept in complete order, and ready for immediate service. The rods should be ringed to guide the line from the reel; and when screwing the joints together, particular attention should be paid to these rings to see that they run regularly on the under-side of the rod, so that the line may not get twisted. The rods should always be kept in a place of moderate temperature, neither too dry nor too moist, as in the former case they would become brittle, and in the latter, rotten; in warm, dry weather, if the joints be slightly shrunk, they may be moistened a little to make them adhere better; but if, through being too wet, they stick together so that you cannot readily take them to pieces, wait till they dry, rather than strain them by forcible separation. It is a good plan to coat the rods once in two or three years with copal varnish, or with India-rubber solution; either of these preparations tends materially to preserve the rods, but especial care must be taken, when re-varnishing, to scrape off the old surface before putting on the new; indeed, the same precaution should be taken if the rods be carried to a fishing-tackle warehouse to be re-varnished.

#### LINES.

THE best and most serviceable lines are those made of horse-hair; for such as are composed of hair and silk, from retaining the water, soon become rotten. The horse-hair should be perfectly twisted, round, even, and without any little irregularities; in point of colour, light gray, or brown, or white, is perhaps the most useful; some anglers, however, prefer a light sorrel tint. The bottom, or casting-line for fly-fishing, which is affixed to the line on the reel, must be of gut, and of about the same length as the rod; the gut should be strong at the top, and very fine at

the "dropper" or bottom ; and before any flies are made upon it, it should be picked and tried, to see that it be of uniform thickness throughout. When fastening the line on the rod, the loop of the line should be passed through the ring at the end of the top joint, carried over the ferrule, and then drawn up to the top again ; by this plan, the loop will be secured, and the line hung from the extreme ring.

It is not worth any lad's while to attempt manufacturing fishing-lines, as they may always be purchased more neatly fabricated, and even at a much cheaper rate, than he could possibly make them.

#### FLOATS.

FLOATS can always be procured ready-made, of all sizes, and every variety of shape. For small fish and slow streams, porcupine, swan, goose, or Muscovy duck quill floats, will be found the best ; and in strong and rapid rivers, or for the larger kinds of fish, cork floats must be employed. If the young angler would rather make cork floats than purchase them ready-made, he should procure a piece of fine-grained, sound cork, and bore through it with a small red-hot iron a hole, put into it a quill which will exactly fit the aperture, and afterwards cut the cork into the shape of a pear. When this is done, he must smoothen it with pumice-stone, and paint and varnish it ; and if he use two or three bright colours in the painting, he will add much to the gaiety of its appearance. As it is essentially requisite that the float should swim perpendicularly in the water, that it may betray the slightest nibble, it must be carefully poised by fastening a few shot on the line : the sizes of shot proper for this purpose, are from swan-shot down to No. 4 ; they should be split about half-way through with a small chisel, so as to make a gap sufficiently wide to admit the line, and when the latter is put in, the gap should be closed with a pair of pliers. The line must be shotted till only the cap of the float is seen above the water ; unless it be rough or rapid, when somewhat more of the float should swim above water.

#### WINCHES.

A WINCH is a most useful addition to your angling apparatus : for, with its assistance, you may reach parts of a river you could not otherwise attempt. When purchasing a winch, select a multiplying one ; it being far superior to all the other kinds, and allowing you to lengthen or shorten your line with the utmost possible rapidity.

## HOOKS.

OF hooks there are four kinds, the Limerick, the Kendal, the Kirby, and the Sneckbend. They are numbered according to their size, from 1 to 13; No. 1 being the largest. The following table shows the sizes of the hooks most suitable to the various fish :

|                    |                     |                    |
|--------------------|---------------------|--------------------|
| Barbel, 7, 8, 9,   | Flounders, 3.       | Roach, 10, 11, 12. |
| Bleak, 11, 12, 13. | Grayling, 10.       | Rudd, 10.          |
| Bream, 10.         | Gudgeon, 9, 10.     | Ruffe, 10.         |
| Carp, 7, 8, 9.     | Loaches, 13.        | Smelt, 9.          |
| Chub, 8, 9.        | Miller's Thumb, 13. | Tench, 9, 10.      |
| Dace, 10, 11, 12.  | Minnow, 13.         | Trout, 6.          |
| Eels, 8.           | Perch, 7.           |                    |

When fastening the hooks on to your lines, use strong, but fine silk; and if you can get it near the colour of your bait, so much the better; wax the silk thoroughly with shoemaker's wax, and wrap it four or five times round the body of the hook, then place the gut or hair on the inside of your hook, and continue winding the silk tightly round till you have wrapped it about three parts down the hook. The chief excellence of a hook is to be neither so brittle as to break when the fish is struck; nor so soft as to straighten with a dead pull.

## BAITS.

THE ash-grub is found in the rotten bark of a tree which has been felled some time: it is an excellent bait for grayling, chub, dace, or roach, and may be used all the year round; it should be kept in wheat bran.

The branding, or gilt-tail, is found in old dunghills, tanner's bark, rotten earth, and cows'-dung: it is an admirable bait for perch, tench, bream, gudgeon, and indeed for almost any kind of fish.

The name of the cabbage-worm indicates its habitats: it is a good bait for chub, dace, roach, or trout.

The caterpillar may be found in the leaves of cabbages, and also on many kinds of trees: it is employed for the same fish as the cabbage-worm.

Of the cod-bait or caddis-worm, there are three kinds: they may be found at the sides of stony brooks, pits, or ponds, and in ditches. They are very good baits for trout, dace, chub, bream, bleak, roach, and grayling.

The cow-dung bob is found under cow-dung from about May to Michaelmas: it is somewhat like a gentle in shape but larger, and should be kept in earth. Chub, carp, tench, roach, dace, and trout, will take this worm with eagerness.

The locality of the crab-tree worm is indicated by its name: it is a good bait for roach, dace, trout, and chub.

Flag or dock worms inhabit the fibres of flag roots in old pits or ponds: they are excellent baits for tench, bream, bleak, grayling, carp, perch, dace, and roach, and may be kept in bran.

Gentles or maggots, are bred by hanging up a piece of meat until it putrefies: they should be kept on flesh, and, when they have arrived at their full size, put into an earthen pan with moss, well washed and squeezed: this will scour them; they will be fit for use in four or five days, and will be lively and tempting baits for all kinds of fish. When putting a gentle on the hook, you must insert the hook at one end of it, and bring it out at the other, and then draw the gentle back until it completely covers the point of the hook.

The lob-worm is generally found late in the evening, from May to September, in short grass: it should have a red head, a streak down the back, and a broad tail; it makes an exceedingly good bait for chub, eels, perch, or barbel.

The meadow or marsh worm is found in marshy places or on the banks of rivers: it is a good bait for trout, perch, grayling, or bream, but it must be scoured for a longer time than the brandling.

Oak-grubs may be gathered on the leaves of the oak tree, and are good baits for chub, dace, roach, or trout.

Palmer-worms, or cankers, are found on herbs, plants, and trees: they are excellent baits for chub, roach, dace, grayling, or trout.

The tag-tail may be procured in meadows or chalky lands, after rain, or in the morning, during the months of March or April: it is a good bait for trout in cloudy weather, or when the water is muddy.

White grubs, or white bait, are much larger than gentles, and may be found in sandy and meadow land: they are good baits from the middle of April to the beginning of November, and are taken by chub, roach, bream, tench, trout, carp, and dace. They should be kept closely covered in an earthen pot with the earth about them.

In order to scour and preserve worms, you must procure some very fresh moss, wash away all particles of earth from it, and squeeze it, but not too dry; then put it into a jar, press it closely down, and place the worms upon it. Keep the jar in a cool spot, and change the moss once in four or five days. When baiting with a worm, the hook should be put in close to the top of the worm's head, and then passed carefully down, gently working the worm up the hook at the same time. Not more than a quarter of an inch of the worm should be left hanging over the hook.



The best method of taking worms is, to insert a thick stick or dibble into the ground eight or ten inches deep, and move it quickly backward and forward, so as to agitate the earth round about it; when every worm within the circle of agitation will appear at the surface.

Wasp-grubs may be taken from the comb in a wasp's nest: they require to be hardened in a warm oven, and will prove a good bait for such fish as will take gentles.

Beetles and house-crickets are good dibbing for chub.

Miller's-thumbs, bleaks, minnows, dace, gudgeons, loaches, sticklebacks, smelts, and roach, are used as baits for some of the larger fish.

Grasshoppers are good baits during June, July, and August, for roach, grayling, chub, and trout: their legs and wings must be taken off before they are put on the hook.

Salmon spawn is an excellent bait for trout and chub: you may purchase it at the shops ready for use; or, to prepare it yourself, about September or October, boil a pound of salmon spawn, for a quarter of an hour, wash away the blood, and pick out all the pieces of skin; add to it two ounces of salt and a quarter of an ounce of saltpetre, and beat them together in a mortar; put it in little jars, and pour over it mutton suet melted; cover the mouths of the jars with bladder, and the spawn will be fit for use at any time, or may be kept for a year or two.

#### PASTE BAITS.

WHEN working up paste baits be particularly careful to have clean hands, and knead your pastes thoroughly, so that all the materials may be well incorporated.

Cheese pastes.—Take some old Cheshire cheese, and the crumb of white bread, and mix them up to a tolerable degree of consistency: and it will make a good bait for chub. Another cheese paste, equally good for chub, may be made out of old cheese, the suet of mutton kidney, and a little strong rennet, mixed together, with a little turmeric, to give the paste a fine yellow colour.

White bread paste.—Knead crumbs of white bread dipped in honey in the palm of your hand until they form a paste, which will be very alluring to tench, carp, roach, and dace.

Wheat paste.—Procure some new wheat, remove the husks, pound it, simmer it in milk or water: when cold, it will be somewhat like a jelly, and a very small piece only should be put on the hook.

Sheep's-blood and saffron make a good paste for roach, bleak, dace, perch, and trout.

For barbel, an excellent paste may be made by dipping the

crumb of new white bread in the liquor in which chandler's greaves has been boiled, adding a little of the greaves, and working it up till stiff.

Paste baits are not at all adapted for swift, running streams, but for quiet brooks, ponds, on very still rivers; you must be quick of eye, and sharp to strike, otherwise both fish and bait will give you the slip. A quill float is better than a cork one, as it betrays the slightest nibble.

#### GROUND BAIT.

GROUND-BAITING is a most essential part of angling, and ought never to be neglected; as success in bottom or float-fishing cannot be expected, unless the proper means for drawing the fish together are resorted to.

For barbel, make the lumps of ground-bait large in proportion to the strength of the current in which you fish; chop or break a pound of greaves into small pieces, and pour hot water over it; let it remain till it softens, strain off the water, work it up with clay into lumps or balls, and add a little bran to it.

For chub, roach, and carp, mix bran and clay together into lumps about the size of an apple; place some gentles in the middle, and close the clay over them. It is a very useful bait in a still pond, hole, or slight eddy.

For roach, dace, and bleak, work some clay and bran together into balls, about the size of a pigeon's egg; some anglers add a few crumbs of bread to it.

For chub, carp, roach, and dace, take the crumb of white bread, soak it well in water, squeeze it almost dry, add bran and pollard to it, and work them up until they acquire the consistency of clay: this ground-bait requires some labour and time to prepare it, but it will always repay the trouble, being the best and cleanest bait for the above-named fish.

For carp, tench, eels, perch, and bream, fresh grains will be found very serviceable; but if the grains be but slightly sour, the fish will not touch them.

Gentles and worms may be thrown into perfectly still water; but, in a stream this ground-baiting is injurious, as the gentles are carried away by the stream, and draw the fish from the spot where your hook is showing its tempting, yet insidious bait.

#### THE DIFFERENT KINDS OF FISH.

WE now proceed to give an account of the various kinds of fish, and their favourite haunts; adding also a few brief additional particulars respecting the hooks and baits most suitable for each.

**THE STICKLEBACK**

Is seldom found more than two inches in length. It thrives in all kinds of ditches and ponds, and may be easily taken by a little piece of worm; it is sometimes used as a bait for perch, and in that case, it should have the prickly back fin cut off.

**THE BULL-HEAD, OR MILLER'S THUMB,**

Is a little fish, which may be found in almost every river or brook: a small piece of worm is a good bait for it, and in its turn, it makes an excellent bait for pike and trout; as a fish for the table, it is not worth the trouble of taking.

**THE MINNOW.**

THIS extremely beautiful little fish is found in most gravelly streams, and is in season from March till October. Although in point of delicacy of flavour, it is equal to any fish brought to table, its diminutive size seems to prevent its being generally cooked.

As baits for other fish, minnows are highly prized by the angler; and the baits most tempting to them, are a blood-worm, a piece of a red-worm, a gentle, or a bit of paste-bait: the tackle must be of the lightest description, and the hook, No. 13. They may be taken at any time of the day, and it is necessary to strike as soon as a bite is perceived.

**THE LOACH, OR STONE LOACH,**

Is a somewhat scarce, and very small fish, seldom exceeding four inches in length. It haunts the bottoms of small gravelly rivulets and brooks, and may be taken at any time

during summer with the tail-end of a red worm. It makes an admirable bait for large eels, and should be used on the night lines.

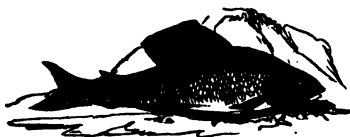
## THE BLEAK.



Is found in most rivers: the best bait is a gentle, and it may be allowed to sink about a foot and a half under the surface of the water. Use a No. 13 hook, a single horse-hair

line, and a very small quill float; frequently throw in a few gentles, or pieces of chewed bread as a ground bait, and strike the instant you perceive a bite. The bleak spawns in May, and is then out of season.

## THE GRAYLING



Is a beautiful fish, and inhabits most of the clear, rapid rivers which have a sandy or gravelly bottom; its favourite haunts being the sides of the stream. A light rod,

cork float, fine hook, and running tackle, are necessary; and when you observe a bite, strike the moment the float descends. Handle your tackle skilfully and gently, as this fish's mouth is exceedingly tender, and easily gives way with the jerk of the hook. The grayling will take caddis, marsh and dew worms; flies, both natural and artificial; and white grubs; it is in best condition in September, October, and November; in fly-fishing for it, have a fine gut, and smaller fly, and be more ready with hand and eye than when angling for trout.

## THE BARBEL.

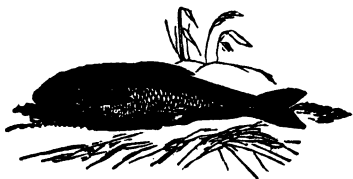


This fish, though but little esteemed for the table, is highly prized by the angler, as it affords him good sport. Still, there is some fear for his tackle; for when of large size, the

barbel is a strong and crafty fish, and will use every expedient to

get off the hook, or snap the line; which, unless the angler exerts his skill, it will certainly achieve. Before you begin fishing for the barbel, throw plenty of ground-bait into the water, and continue to do so at intervals: the best bait for this purpose is one made of soaked greaves, bran, and clay, mixed together in balls about the size of an egg; a quantity of worms chopped into pieces, make also a very good bait; salmon or trout spawn, maggots, and a paste composed of mutton suet, cheese, and honey, mixed together, are likewise very tempting to this fish. The barbel being a very sharp and quick biter, you must strike smartly the moment you see a nibble, then let him run some distance before you turn him; keep him away from weeds, strive to get him into deep water, play him until he has lost all his strength, and then haul to land. In the Thames, barbel are usually fished for from punts or boats; a strong rod is necessary, with running tackle, gut line, quill float, and a No. 7 or 8 hook; the bait should always touch the bottom of the stream.

#### THE GUDGEON.



The gudgeon is a very bold biting fish: it is in season from April to October, and may be taken at any time of the day, particularly in dull weather. The best bait is a blood-worm; and the tackle should

be a fine gut or hair line, light cork float, and a No. 9 or 10 hook. Gudgeons frequent the shallows, where the river is free from weeds, with a gravelly or sandy bottom, which must be often stirred with a rake made for that purpose. Allow your bait to touch the ground, and before you begin, plumb the depth of the stream. In the rivers Lea and Thames, immense numbers of this fish may be taken in a day; and there is a fascination in gudgeon-fishing, which it is not easy to account for.

#### THE ROACH.



The rod should be long and very light, the line of extremely fine gut, and the hook No. 9 or 10. The angler must hold the rod

so low, that the end of it is not more than fourteen inches above the float, which should have shot attached to it, in order that little more than the eighth of an inch of it may ride above the surface; as roach bite so delicately, that without you pay the strictest attention to your float, you will lose four bites out of six: when using a single line, you must have a landing-net ready, otherwise you will run the hazard of breaking your line. A paste made of second day's white bread, slightly dipped in water, with a little vermilion added to it, so as to make it a salmon colour, is the best bait for these fish; but in summer they will also take gentles; and in spring and autumn, sometimes blood and red worms; however, the paste is far more attractive to them, and when you use it, a little piece, about the size of a pea, will be enough on the hook at a time. Before you begin fishing, plumb the depth carefully, and throw in ground-bait plentifully; the ground-bait may be the same as that used in barbel-fishing; and while angling, frequently cast into the stream some of the bait, or chewed bread, near your float. Allow the bait to touch the ground, and gently and occasionally take the depth again, especially if the fish leave off feeding. Roach breed and thrive in rivers, ponds, and canals; they frequent the shallows, eddies, and deep holes, and may also be found near bridges, locks, and piles, about flood-gates, and in those parts of the stream where the bottom is sandy. In rivers, they bite all the year round, but in ponds only during the summer.

## THE DACE.



THE dace is found in most rivers: it is a handsome fish, and is generally accounted light, nourishing food. It affords good amusement to

the angler, as it bites freely: the hook should be a size larger than for roach, but in all other respects the tackle may be the same. Use a ground-bait of bran and clay mixed, and throw it into the water frequently while angling. Dace will take red worms, maggots, wasp-grubs, greaves, and a paste made of cheese and honey; they are partial to red worms in the spring, and in the summer, if you use gentles, put two at a time on the hook; a small piece of greaves with a gentle is also a very good bait. You may begin fishing for them in March, and they continue in season till October; after that time they seldom bite, unless the weather is very mild.

## THE BREAM.



THE bream is principally found in large lakes, and still rivers. It may be taken in the spring and summer, but as it spawns during June and July, it is best to angle

for it in May, when it is in its prime; and from the end of July to the end of September; and in these months, from sunrise till eight o'clock in the morning, and from five o'clock till dusk in the evening. Use a gut line, quill float, and No. 10 hook, and let the bait touch the bottom, or nearly so. The baits necessary, are well-scoured red worms, maggots, wasp-grubs, flag-worms and brandlings. Use lob-worms cut in pieces, and grains, as ground-baits before you commence angling. The angler should be very silent, keep from the edge of the water as much as possible, and strike the instant the float is drawn under the surface.

## THE RUDD.

THIS fish is held in little esteem for the table: it very much resembles the roach in shape and colour, and thrives best in ponds. It will take red worms, paste, and gentles; and the tackle requisite consists of a gut line, quill float, and No. 10 hook. Let the bait touch the bottom, and strike the moment you see a bite.

## THE CHUB.

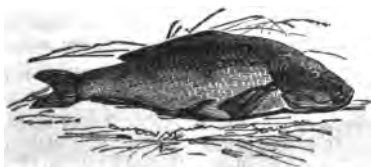


THE chub in summer delights in scours, tumbling bays, and the deep and rapid parts of rivers; and in the autumn and winter, in the little holes

under banks, where the stream is sheltered by overhanging willows. It is a bold biting fish, and may be caught all the year round: in the summer it bites during the whole of the day, but best in the morning and evening; it may also be taken in the night-time. It is a very bony fish, and not particularly fine food, in summer; but in winter it is somewhat better flavoured. The baits adapted for chub are maggots, red worms, gentles, bullock's brains, and pith from the back-bone of a bullock; during the

spring, a live minnow makes a very enticing morsel; and as the chub prefers a large bait, when you use red worms, put two on the hook at a time; in winter, a paste made of bread and honey, will be found exceedingly useful. Throw in plenty of ground-bait, made of soaked bread, bran, and pollard, well worked together, before you begin; and also at intervals, while you continue fishing. During May and June, chub may be easily caught by a fly, a beetle with his legs and wings taken off, or a large snail. During the spring months, fish as near the middle of the stream as you can, and allow the bait to drag on the ground. Use running tackle, gut line, quill float, and No. 8 or No. 9 hook; strike the instant you perceive a bite, and let the fish run, giving it plenty of line, otherwise it will break loose, as it usually darts furiously away to the opposite side, the moment it is struck.

### THE CARP.



This is a very sly, cunning fish; indeed, from its extreme craftiness, it has sometimes been styled the water-fox. It is found in lakes, ponds, and rivers, and frequents the quietest

and deepest parts of the stream, especially holes near flood-gates, and beds of weeds. It spawns in May, June, and July, and is in season in March or April. The best time to angle for this fish is either very early or very late, as it seldom bites in the middle of the day, unless a soft shower of rain happens to fall. Use a long, light rod, with a reel, and let the line be of the finest description; the hooks, if worms be employed as bait, should be Nos. 5 or 6; if maggots, Nos. 8 or 9; and if wasp-grubs, No. 7. The best bait, especially in the early part of the season, is a red-worm well scoured; in the summer, brandlings, maggots, cabbage-worms, wasp-grubs, and gentles, are very good baits; as is likewise a paste made of new bread and honey, worked together. Throw in a ground-bait, made of fresh grains, lob-worms cut in pieces, and a little bran or greaves, mixed together, the night before you intend to fish; and it is necessary to plumb the depth at the same time, so that you do not have to disturb the water just at the moment you wish to begin your sport. Keep a very watchful eye on the float, and stand as far from the water's edge as you conveniently can; strike the instant the float disappears, and if you hook a large fish, give him line cautiously.



## THE TENCH.



freely in the summer months, especially on dark, warm, murky days, and during fine mild showers. They spawn in May, and the best time to angle for them is early in the morning, and late in the evening.

The tench thrives best in ponds where the bottom is composed of mud or clay; but a few may sometimes be taken in rivers. Tench will take the same baits, and may be found in the same haunts, as carp; they bite

## THE PERCH.



The perch, which in point of flavour is surpassed by none of the fresh water tribes, is a voracious and bold fish, and takes a bait very freely. Strong tackle is necessary in angling for it; gut or twisted hair

line, cork float, and No. 7 hook. Marsh, brandling, cabbage, and well-scoured red-worms, maggots, and wasp-grubs, are excellent baits for this fish; but the best, perhaps, is a live minnow: and in employing this bait, a No. 4 or 5 hook should be used, which must be passed either through its back fin or through its lips. Ground-baits of stewed malt, grains, or lob-worms cut up pieces, should be thrown into the water, before you commence angling. Perch lurk near bridges, mill-pools, and locks, in navigable rivers and canals, and in other streams; near rushes, in dark, still holes and eddies, and in the gravelly parts of rivers. They spawn in February or March, and may be taken from April to October; the best season for them is during April, May, and June, in which months, they may be taken from daylight till about eleven in the forenoon, and from three in the afternoon till dusk. Dark, windy days, if the weather be not too cold, are the best for perch-fishing.

## THE POPE, OR RUFFE.



This fish resembles the perch in shape, and is sometimes called the ruffe perch. It is found principally in slow, deep rivers, which have a gravelly soil, and its spawning-time is in April. In angling

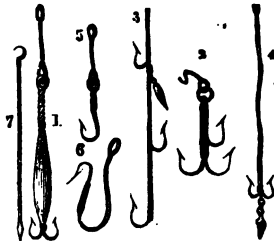
for it, use a quill float and a No. 7 hook; the moment you observe a bite, strike without allowing much line. The proper baits are small red-worms and brandlings, and they should be suffered to drag lightly on the ground; throw in a ground-bait made of clay and worms, if the water be clear, but if it be muddy, use worms alone. This fish will bite freely at any time of the day during summer; but mostly in cloudy, sultry weather.

## THE JACK, OR PIKE.



This is one of the best flavoured and most esteemed of fresh water fish: it spawns in April, and although reckoned good from midsummer to Christmas, it is in its prime during September and Oc-

tober only. The baits used in fishing for it are, roach, dace, gudgeon, minnows, chub, bleak, and young frogs; and the proper size of a bait is when it weighs from one to four ounces. There are several methods of trolling for this fish, namely: with the gorge-hook, No. 1, annexed, which is loaded on the shank with lead; with the snap-hook, either spring or plain, composed of three hooks fastened together, Nos. 2, 3; with the bead-hook, formed of two single hooks, tied back to back, with a little drop or bead of lead affixed to a link or two of chain, depending from the



lower part of it, No. 4; and with the live-bait hooks, which may be either single or double, Nos. 5 and 6. In baiting these various hooks, the following directions must be carefully attended to:—



**The GORGE-HOOK.** Hook the curved end of a baiting-needle, No. 7, to the loop of the gimp on which the hook is fastened, pass the needle through the mouth of the bait, and bring it out at the tail; the lead on the hook will thus be hidden in its belly, and the barbs or shanks inside its mouth; and in order to keep the bait steady on the hook, tie its tail to the gimp with some white thread.



**The SNAP-HOOK** is baited by thrusting the point of the upper or small hook under the skin of the bait, on the side, and bringing it up to the back fin. Another snap-hook is baited by passing the loop of the gimp inside the gill of the bait, and

bringing it out at the mouth; the lead thus lies in its throat, the first hook outside its gill, and the others in its side, the barbs being just beneath the skin; the bait's mouth should next be sewn up, so as to keep the lead and hooks in their proper places.



sewn up with white thread.

**On a BEAD-HOOK**, a gudgeon or barbel is the best bait; the little drop or bead of lead should be put into its mouth, which should afterwards be



**The LIVE-BAIT** must have a No. 3 or 4 hook passed either through its lips or the flesh beneath the back fin; in the latter case, care must be taken

not to touch the back-bone, or the bait will soon die.

The rod for trolling must be very strong, about fourteen feet in length, and have a whalebone or hickory top; the line must be at least thirty yards in length, made either of silk, or silk and gut twisted together, and be kept on a winch. When you begin trolling, first fasten the winch on to the rod, then pass the line through the rings on the under side of the rod, and attach the hook to the line by a small swivel; next, grasp the rod in your right hand, just above the winch, and rest the butt end of it against the side of your stomach; draw out, with your left hand,

a yard or two of the line from the swivel, hold it firmly, and then with a sharp jerk from your right hand, cast the bait into the stream; let the line which you hold in your left hand run out freely, that the hook may not be checked when cast out, by your holding the line too fast, and so fall short of the spot you wished to reach. Let the bait touch the water very lightly, and allow it to sink nearly to the bottom; then draw it gradually to the surface, and continue moving it in this manner, till you feel a bite, when let out your line quickly, give the fish about five minutes to gorge, strike, and draw in until you see your prize; play him very carefully, and keep him away from weeds or piles, or anything likely to endanger the safety of your tackle. When you fish with a live bait, put on a strong gudgeon that will live some time; use a middle-sized, barrel-shaped cork float, put a few swan-shot on the line, and adjust it so that the bait may hang about mid-water; let it float for a few minutes, without taking it out, and then proceed as before directed. When fishing with a snap-hook, either spring or plain, allow the fish no time to pouch, but strike immediately you feel a bite. If you troll with the bead-hook, throw it in as directed for the gorge-hook, draw it frequently to the surface, and let it sink gradually again. You may now and then take it out of the water, and cast it into a fresh place, and so fish every yard of the stream where it is probable a pike may be; when you feel a bite, let the fish run, and give him time to gorge, before you strike.

The favourite haunts of pike are the deep eddies in tumbling-bays, and deep still water in rivers; near beds of candock weeds, and mouths of ditches or small streams which empty themselves into rivers, and by flood-gates, and close to beds of bull-rushes in lakes and canals. When the water is muddy in rivers, and during floods, the pike makes its way into the little streamlets which communicate with the river, yet are out of its currents; as the water in those places is tolerably clear, whilst that in the main stream is turbid. Pike will feed at all times of the day, but they bite most freely during a breeze of wind; even in stormy, chilly weather, you may troll for them with success, when all other fish refuse the most enticing baits; if the weather be very frosty, or when northerly and easterly winds have set in, you must not calculate on much sport; but directly the wind shifts to the south, then these fish will bite readily. When you use live baits, take at least six in your kettle, and give them fresh water often; if you intend to employ gorge-hooks, bait three of them before you begin, and keep them in bran in a bait-box, large enough for the baits to lie at their length; always have fresh and lively baits, for the pike is extremely fastidious in his taste. A jack becomes a pike when it weighs three pounds.

## EELS.



EELS love muddy and still waters, and are in season all the year round. There are several methods of taking them, viz. : by rod and line, night and dead lines, sniggling, bobbing; and trimmer fishing, and the most alluring baits

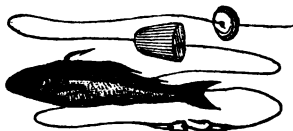
are wasp-grubs, maggots, and small red worms. If you use a rod, the line must be either of strong gut or twisted hair, and the hook No. 8 size. Let the bait touch the bottom, and when you perceive a bite, allow the float to remain for a moment under water before you strike. When using the dead line, which should be of whipcord, a bank-runner must be employed; five or six hooks should be put on the line about nine inches asunder, and they should be baited with small fish, or lob-worms.



For sniggling, the line must be either of platted silk or whipcord, and instead of a hook a stout worsted needle should be fastened by its middle to the line. A large marsh or small lob-worm, tough and well scoured, is the best bait for this species of fishing; and when you bait your needle, you must thrust its point into the worm's head, and draw it through the body of the worm, until the latter completely enshrouds it. When you go out sniggling, you should carry the line on a winder, in your hand, and search for the fish near flood-gates, wharfings, bridges, piles, holes in the banks of rivers, ponds, and canals; likewise in ditches, and amongst osiers and willows. You must put the bait into the lurking holes by means of a stick with a forked head; and when you find that the bait is taken, by the line being pulled further into the hole, give the fish a few seconds to gorge, and then strike smartly, which will instantly cause the hook to fall across in his stomach; then hold the line fast, and pull it towards you. Bobbing for eels is thus practised: a large quantity of marsh-worms should be procured, and as many as will make a bunch about the size of a turnip, strung on worsted by passing a needle through them from head to tail, and fastening them on your line, so that all the ends may hang level; affix in the middle of the bunch a leaden plummet of conical form, and then tie the whole to a stout rod or pole: next, cast your bait softly into the water, and move it gently up and down, until you perceive by the jerks

on the line that the eels are attracted to; then draw the line very steadily to the surface, and land it with all possible expedition. During warm weather, the shallow parts of the stream are the most likely haunts of these fish.

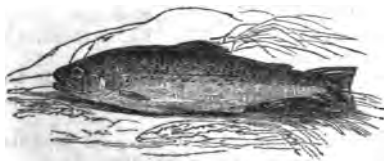
For trimmer fishing, fasten a double hook tied to gimp to a line about fifteen or twenty yards in length, and at about a foot above the hook, fix a wine-bottle cork firmly on the line, and a bullet about two feet above the cork. When you wish to bait—say with a gudgeon—attach your baiting needle to the loop of the gimp on which the hook is fastened, thrust the point of the needle under the skin of the fish near the back-bone, beginning about a quarter of an inch from the head, and pass it very carefully along between the skin and the flesh until within an inch of the tail, when draw out the needle and gimp so that the hooks may come into the place



where the needle was inserted; fasten off the loop of the gimp to the line, and the bait will then be ready for service, as shown in the illustration; if the bait be put carefully on the hook, it will live many hours in the water. Select

a place free from weeds, hold the line in your left hand, and a forked stick in your right; put the stick under the line just above the bullet, and by once jerking it, you may throw the bait into any part of the river; then fasten the line either to a peg stuck firmly on the ground, or to a bank-runner. The night-lines must be of strong small cord about ten yards in length, and the baits small dead roach, gudgeons, or dace; some anglers, however, use worms and frogs. If you employ a fish, you must put it on a double eel-hook, such as are sold at the shops, tied to gimp, wire, &c., in the manner described for trolling for pike; then put the hook on the line, and about two feet above the hook, a bullet, to steady both. The line should then be cast into the stream, and fastened to a peg driven into the bank.

#### THE TROUT.



THE trout "in speckled pride" is, perhaps, the most beautiful of all fish; whether we regard its elegant form, or charming colours. Being a very strong fish, it affords much

sport to the angler, and compels him to use a stout rod, running tackle, and a cork float. Trout are in season from April to October or November: they will take minnows, frogs, artificial and natural flies, snails, worms, caddis, cow-dung and lob-worms, white grubs, spiders, millipedes, salmon spawn, and paste. Minnows are the most killing baits, and by them the largest fish are caught; in putting one on the hook, which should be No. 6, pass the latter either through its lips or under its back fin. When fishing with a minnow, cast your bait lightly into the water, and draw it against the current; and when you use worms, you may let them drag on the bottom: you may dispense with the cork float when employing the latter bait. Do not strike the instant you feel a bite, but rather wait till two or three tugs have been made, and then try your skill. The trout seldom bites during the day, unless it is dark cloudy weather, with a stiff breeze blowing; the angler must, therefore, be at his post very early or very late. This fish's favourite haunts are deep dark holes and eddies, mill tails, pools, the roots of trees, and below bridges and weirs.

#### NATURAL-FLY FISHING.

NATURAL-fly fishing, usually termed dapping, is practised with a long rod, running tackle, and fine line. When learning this system of angling, begin by fishing close under the banks, gradually increasing your distance until you can throw your fly across the stream; screening yourself behind a tree, a bush, or a cluster of weeds, otherwise you will not have the satisfaction of lifting a single fish out of the water. In rivers where weeds grow in the summer, so as almost to check the current, you must fish in the most rapid part of the stream; taking care that in throwing your line, you do not entangle it amongst the weeds. Draw out only as much line as will let the fly just touch the surface; and if the wind be at your back, it will be of material service to you in carrying the fly lightly over the water. Keep the top of your rod a little elevated, and frequently raise and depress it, and move it to and fro, in order that your fly, by its shifting about, may deceive the fish, and tempt them to make a bite. The instant your bait is taken, strike smartly; and if the fish be not so large as to overstrain and snap your tackle, haul it out immediately, as you may scare away many while trying to secure one. We proceed to enumerate a few of the most successful natural baits.

The red copper-coloured beetle is an extremely good bait for trout, if the outer hard wings be clipped, and the insect hung with its feet downward.

Wasps, hornets, and humble-bees are esteemed good baits for dace, eels, roach, bream, chub, and flounders; they should be

dried in an oven or over the fire, and if not overdone, they will keep for some time.

In March, the blue dun and cow-dung flies make their appearance, and may be used throughout the year. The March brown fly appears about the same time, but is out of season at the end of April; it is a capital bait, and it kills most from eleven till three.

In April, the green tail and gravel flies come out: they are soon out of season, the former continuing not more than a week, and the latter about a fortnight. The black gnat, which continues till the end of May, and the stone fly, complete this month's list.

In May, the increasing warmth of the weather brings more insects forward: accordingly, the green drake, the grey drake, the fern, hazel, ash, orl, little iron blue, and yellow sally flies, form the bill for the month. The two first flies appear much about the same time, and are excellent baits in trout-fishing: they continue in season about a month; and are very plentiful on sandy, gravelly streams. The fern and ash flies continue till September; the hazel, yellow sally, and little iron blue flies for a month, and the orl fly for about two months.

In June, the white gnat, cock-tail, gold-spinner, governor, blue gnat, whirling dun, hares' ear, and kingdom flies, make their entrée. The gold-spinner, governor, and kingdom flies, continue till August; the blue gnat for about a fortnight, and the other flies in this month's list, during the summer.

In July, August, and September, the lists are very scanty: in the first-named month, the red ant; in the second, the whirling blue; and in the last, the willow fly, are the only novelties; they continue in season till the conclusion of the fishing season.

Ant flies may be procured from June till September in their hills: they are never-failing baits for chub, roach, and dace, if you let your hook hang about six inches from the bottom of the stream.

The great white moth, which can be obtained in the summer evenings in gardens, on trees and shrubs, is a serviceable bait when dabbings for roach in the twilight.

The hawthorn fly makes its appearance on hawthorn trees, when the leaves are beginning to sprout; it is a dark-coloured fly, and is used as a bait for trout.

The bonnet-fly, which frequents standing grass, is an extremely good bait for chub and dace.

Common flies are, by some anglers, reckoned the best baits for dace and bleak: two or three of them at a time should be put on a No. 10 hook, for dace, and one on a No. 12 hook, for bleak.

Ant flies must be kept in bottles, with some of the earth from



which they were taken. Common flies may be kept in a bottle; but the most convenient natural-fly-holder is a horn bottle made in a conical form, having a wooden bottom pierced with a multitude of small holes to admit air, and which apertures must be so small that the minutest fly you employ cannot escape through. The apex of the cone should be stopped up with a cork, so that by uncorking it you may take out your baits easily, without losing any of them.

#### ARTIFICIAL FLY-FISHING.

ARTIFICIAL fly-fishing is, unquestionably, the most scientific mode of angling; requiring great tact and practice to make the flies with neatness, and to use them with success, and altogether, much more skill than the ordinary method of bottom fishing. Still, several kinds of fish will not rise at a fly; and even those that do, will not be lured from their quiet retreat, during very wet or cold weather. The learner should, if possible, go out with an experienced angler, and imitate his movements; but, as all our readers may not enjoy such an advantage, we subjoin some instructions by which they may pursue this interesting branch of angling, and

"Lure with gaudy bait the glittering brood."

The artificial flies sold at the fishing-tackle shops, are manufactured so skilfully and naturally, that, in our opinion, the young angler will find it more to his advantage to purchase them ready-made, than to make them himself; but, for the guidance of those who would rather fish with a fly of their own contrivance, we detail the proper method of making them. The various requisites are feathers of the bittern, golden plover, grouse, land-rail, jay, starling, and woodcock; hackles, or feathers from the neck of cocks and peacocks; fur from the skins of moles, squirrels, and water-rats; bears' and camels' hair of different colours; cows', badgers', and spaniels' hair; tails of the squirrel, white weasel, black rabbit, black, yellow, and dun cats, and the yellow fur from the throat of the martin; mohair of different shades, camlets, black horse-hair, hog's-down dyed of various colours; sewing silk of different tints and thicknesses, and gold and silver twist. A pair of fine-pointed scissors, and a pair of small pliers, are indispensable. Having collected the materials, try the strength of the gut; then take in your left hand the hook, wind some silk round it two or three times, lay the fine end of the gut on the under side of it, and beginning at the bend, wind the silk three or four times round both the gut and the hook; fasten in the hackle, and continue winding on the silk until you reach the end of the hook, when you must form the head of the fly by

turning the silk back, and winding it several times round. Next, twist the dubbing on the silk, wind it on the hook for nearly half the intended length of your fly, and fasten it off; when you have wound enough of the feather upon the hook, hold the remainder under your left thumb, and with a needle pick out the twisted and entangled fibres; continue twisting the silk and dubbing over the end of the hackle, until you make the body of the fly the proper length, and then fasten off.

In making a winged fly, fasten the hook on to the gut in the manner above described; take the feather intended for the wings, and place it on the upper side of the shank, with the roots turned toward the bend of the hook, and fasten the feather securely down by twisting the silk over it; clip the root ends closely with your scissors; then, with a needle divide the wings as evenly as possible, passing the silk two or three times between them, so as to make them take their proper position. Carry your silk toward the bend of the hook to about the length which you intend your fly to be, and fasten it there; lay on your dubbing, and then continue winding the silk up toward the wings; put the hackle in for the legs, wind it so nicely under the wings that the ends of the cut fibres may be quite hidden, and then fasten the silk off above the wings. When gold or silver twist is used, it should be fastened to the lower end of the body before the dubbing is put on. Although it is a good plan to imitate nature when making these decoys, yet anglers frequently find that what are termed fancy flies, or flies which neither in shape nor colour resemble any known species, will attract fish, where the best copies from nature have failed. The fly at the end of the line is usually termed "the stretcher," and the others "droppers;" the first dropper should be put on the line about a yard above the stretcher, and the second about three-quarters of a yard from the first; they should be made on separate pieces of gut, about four inches in length, for the purpose of being taken off at will.

#### ARTIFICIAL FLIES.

THERE are upwards of a hundred different kinds of flies suitable for this species of angling; but we can only describe those most in use. The cow-dung fly may be used from the 1st of April, and will kill till September. Its wings should be made of a feather of the land-rail, its body of yellow camlet mingled with a little fur from the brown bear, and its legs of a ginger hackle; its wings should be trimmed flat. The blue dun is an excellent fly during March and April, and should be used in the middle of the day. Make its wings of a starling's feather, body of blue fur



from a water-rat, mixed with a little yellow-coloured mohair; and its tail, which is forked, of two fibres from the feather which you use for the wings. The black gnat makes its appearance about the latter end of April, and will be found useful till the close of May. A black ostrich's harl must be used in making the body of this fly, and a starling's feather for the wings; it should be trimmed short and thick. This fly is reckoned a good killer when the water is rather low. The violet fly is also used in April: it is made of light dun-coloured bear's hair, mixed with violet stuff, and winged with the gray feather of a mallard. The stone fly, which may be used with success during May, especially in the mornings, is composed of dun bears' hair, mixed with brown and yellow camlet, putting more yellow on the belly and tail than on any other part; a grizzled hackle for the legs, and a mottled feather from a hen pheasant, or blue cock's hackle for the wings, which must lie flat.



The green drake, or May fly, is, perhaps, the best fly that can be procured for trout-fishing. Its wings should be made of the light feather of a gray drake, dyed lemon colour; its body of yellow-coloured mohair, neatly ribbed with green silk; head of a peacock's harl, and its tail of three long hairs

from a sable muff. The yellow sally is an approved fly from the early part of May to the end of June: its body must be made of yellow unravell'd worsted, mixed with some fur from a hare's ear, and its wings of a hackle dyed yellow; the wings must lie flat. The gray drake appears about the same time as the green drake, which, indeed, in shape it very closely resembles: it is a very serviceable fly from three o'clock till dusk. Make its body of a white ostrich harl, and stripe it with dark-coloured silk; its wings of a gray feather from a mallard, and its tail of three hairs from a sable muff. The oak-fly, down-looker, or ash fly, is usually found on oak and ash trees, during May and June, with its head pointing downward towards the roots of the trees. Its wings, which must lie flat, should be made with a wing feather from a partridge; its body of dun-coloured fur mingled with yellow and orange mohair, and its head of fur from a hare's ear. The purple fly, made of purple wool mixed with light brown bear's hair, and dubbed with purple silk, is useful during June and July.



The red ant's wings must be made of a light feather from a starling, its body of a peacock's harl, and its legs of a ginger-coloured hackle; be careful to make its body thick at the end. This fly first appears in June, and continues till August: it is esteemed a capital killer

from eleven in the morning till six in the evening.

The dark alder fly, in May and June is a great favourite: it may be imitated by a dark-shaded pheasant's wing, black for its legs, and a peacock's harl ribbed with silk hackle for the body. The fern fly also appears in the early part of summer: its body is dubbed with the wool from a hare's neck, and its wings are made of a darkish gray mallard's feather.



The palmer is a most killing bait during the summer: its body should be made to resemble a hairy caterpillar, with black spaniel's fur on the harl of an ostrich feather, wrapped over with a red hackle from a game cock. The wasp fly, made of brown dubbing or the hair of a black cat's tail ribbed with yellow silk, is an excellent fly during the month of July. About the same time, the orange fly

is in vogue: its wings are made of a feather from a black-bird's wing, and its body of orange-coloured crewel, or wool. The whirling blue makes its appearance in August, and is a good bait till the end of the season: its wings must be made of a feather from a common tern, its body of light blue fur mingled with a little yellow fur, and its legs of a light blue hackle.



The whirling dun is also a summer fly: its wings are made of a snipe's feather, its body of blue fur wrapped with yellow silk, its legs of a blue cock's hackle, and its tail of two hairs from a light-coloured muff. The late badger-fly is also serviceable in August: it is made

of black badger's hair whipped with red silk, and winged with a darkish gray mallard's feather. Imitations of the house and blue-bottle flies are taken greedily in August: they are also particularly killing after floods in autumn. The willow fly appears in September, and is the best bait during that month and the remainder of the season: its body must be made of blue squirrel's fur, with a little yellow mohair intermixed, and its wings of a dark grizzled cock's hackle.

In closing these few instructions, we recommend the tyro when he proceeds on an artificial fly-fishing excursion, to take a few requisites for fly-making with him; so that if the fish be over-dainty, and will not take such baits as he offers to their notice, but prefer natural flies, he may immediately suit their tastes by some, as closely as he can, to resemble those he sees hovering over the surface of the stream.

## CASTING THE LINE.

THE rod for artificial fly-fishing should be light and flexible, and one which you can wield with ease. Raise your arm, and swing the rod back, without effort, so as almost to describe a circle round your head; and when the line has reached its full extent behind you, throw it forward, with great care; else when you have a fly on the line, you may, perchance, jerk it off, particularly if you attempt to make the forward move, ere the line has reached its full circuit. To acquire a good style of throwing, and a correct eye for measuring distances, practise, at first, at a short length only, without a fly, on the line, and then with one, two, and three flies, successively; it is also a good plan to fish in rapid streams until you can cast the fly dexterously. The fly should uniformly be dropped lightly on the surface of the water: when you perceive a rise, throw your fly a little above the spot and let it drop gradually down the stream; directly the bait is taken, strike quickly, else the fish will discover its artificial character, and refuse it. When you have hooked a fish, run him down the stream, play him very cautiously, keep his head up, and at the same time draw him by gentle force toward you. Keep your back to the wind if possible, as you can then stand farther out of the fish's sight, and so angle on both sides of the river, if it be not a very broad one: if the sun be up, stand with your face to it, so that your shadow may not be cast upon the water; for the vision of fish is so acute, that they are easily scared by shadows in motion, or even at rest, projected from the bank; and often has the angler to regret the suspension of a successful fly-fishing by the accidental passage of a person along the opposite bank of the stream; yet by noting the apparently trivial habits of one of *Nature's anglers*, not only is our difficulty obviated, but our success insured. "The Heron," says the *Angler's Museum*, "guided by a wonderful instinct, preys chiefly in the absence of the sun; fishing in the dusk of the morning and evening, on cloudy days and moonlight nights. But, should the river become flooded to discoloration, then does the 'long-necked felon' fish indiscriminately in sun and shade; and, in a recorded instance of his fishing on a bright day, it is related of him, that, like a skilful angler, he occupied the shore opposite the sun."

The best time for fly-fishing is generally when the day is overcast and gloomy after a clear night, or when a light breeze just agitates the surface of the stream; and if the wind be from the south or west, and the water turbid from recent heavy rains, it is all the better for the angler. Fish every yard of water likely to afford sport, and keep your fly continually in motion, that it may appear to be a natural one. The list of natural flies, with the months in which they usually appear, appended to the article on

natural fly-fishing, will serve as a guide to the proper times for using artificial ones; as fish seldom rise at imitations of flies not naturally in season.

#### MONTHLY GUIDE FOR BOTTOM FISHING.

**JANUARY.** Chub, pike, and roach, are the only fish that can be taken in this month; the middle of the day is the most seasonable time, provided the water is tolerably clear, and free from ice.

**FEBRUARY.** Toward the latter end of this month, when the weather becomes somewhat mild,—carp, gudgeons, and minnows may be taken, as well as pike, chub, and roach. The perch spawns either in this or the next month.

**MARCH.** Minnows, roach, chub, gudgeons, tench, carp, and trout, form the bill of fare. Bleak, pike, perch, and dace, spawn. In this and the preceding month, the middle of the day is the best for angling.

In **APRIL**, the increasing warmth of the weather, brings also increase of sport; with tench, perch, trout, roach, carp, gudgeons, flounders, bleak, minnows, and eels. Barbel, pike, chub, ruffe, and dace, spawn.

**MAY.** Perch, ruffe, bream, gudgeons, flounders, dace, minnows, eels, and trout, may be taken. Carp, barbel, tench, chub, roach, and bleak, spawn.

**JUNE.** Roach, dace, minnows, bleak, gudgeons, eels, barbel, ruffe, perch, pike, and trout, are in season. Carp, tench, bream, and gudgeons, spawn.

**JULY.** Trout, dace, flounders, eels, bleak, minnows, pike, barbel, gudgeons, and roach, afford good sport. Bream and carp spawn.

**AUGUST.** Barbel, bream, gudgeons, roach, flounders, chub, dace, eels, bleak, minnows, pike, ruffe, and perch, bite freely.

**SEPTEMBER.** Roach, gudgeons, dace, chub, eels, tench, bleak, minnows, barbel, bream, ruffe, pike, trout, perch, and grayling, are in season.

**OCTOBER.** Tench, gudgeons, roach, chub, dace, minnows, bleak, pike, trout, and grayling, are in season; trolling or bottom fishing for chub and roach may be successful; fly-fishing is generally over.

**NOVEMBER.** Roach, pike, chub, trout, and grayling, are the only fish in season.

**DECEMBER.** In favourable weather, pike, roach, and chub, may sometimes be taken; but all other fish have retired to their winter retreats, to screen themselves till the voice of Spring again re-animates, and calls them forth to their old haunts.

## RIVERS, CANALS, AND PONDS, IN THE VICINITY OF LONDON.

**THE THAMES** contains all kinds of fish : it is under the jurisdiction of the Lord Mayor of London as far as Staines, up to which place no one is allowed to fish, (under a penalty of twenty pounds), during the months of March, April, and May, as most fresh-water fish cast their spawn during those months.

From Staines to Battersea, various parts of the river are staked out, and bailiffs appointed to see that the fish are not taken by improper means ; the angler may, therefore, be certain of meeting with plenty of sport in those places.

In the **NEW RIVER**, which is free, from its source near Ware in Hertfordshire, to Islington, many fine fish may be found ; and chub, eels, gudgeons, bleak, minnows, dace, roach, and perch, may be taken within half a mile of the metropolis.

The river **LEA**, which runs into the Thames at Poplar, abounds with fine fish. Pike, carp, chub, perch, barbel, eels, gudgeons, roach, dace, tench, and bleak, and occasionally a trout, may be taken. Some parts of the river are preserved ; and for permission to angle there, you must pay a certain sum annually. At Waltham Abbey, there are several branches of this river abounding with fish ; they are, however, protected.

The **RODING**, which runs into the Thames at Barking, produces an abundance of eels, chub, perch, roach, pike, and tench. There are many deep holes and favourable spots for angling in this river, at Abridge, Woodford bridge, Loughton, Ilford, Wanstead, and Barking.

In the **MOLE**, which empties itself into the Thames at East Moulsey, in Surrey, many chub, carp, dace, gudgeons, bream, roach, pike, perch, trout, and other fish, may be found. Fine trout may be found near Esher, Leatherhead, and Cobham.

The **WANDLE**, the best and clearest stream near London, has, at Mitcham, Merton, Carshalton, and Wandsworth, dace, gudgeons, carp, pike, perch, and fine trout.

The **RAVENSBOURNE**, in Kent, contains good roach, chub, gudgeons, perch, trout, and dace.

On Chiselhursts common, in Kent, about twelve miles from London, are some ponds stored with carp and tench, &c.

A mile to the east of Shooter's hill, in Kent, there are some ponds on a common near the road side, containing carp, tench, &c. ; these ponds are free to all anglers.

The **CAMBERWELL CANAL** contains pike, roach, perch, and eels.

The **PADDINGTON CANAL** has chub, eels, gudgeons, perch, roach, and pike.

The river **WEY**, in Surrey, which joins the Thames near Oatlands park, contains, barbel, ruffe, dace, gudgeons, carp, pike, and roach.

**DAGENHAM BREACH**, in Essex, is preserved for angling, and is well stored with carp, pike, bream, eels, perch, &c.

The **LAKE** in the gardens of Hornsey-wood house contains perch, tench, roach, &c.; and in it, persons taking refreshment at the tavern are allowed to fish.

On **Hampstead heath**, and **Clapham common**, are some free ponds, containing perch, carp, and a few other fish.

At **Stanmore**, in **Middlesex**, ten miles from London, there are two or three ponds on the common, (near the Vine public-house), in which perch, tench, &c., may be found. Between these ponds and **Stanmore Priory**, about a mile distant, is a very fine piece of water, called the **LONG POND**, which contains pike, &c.

**Snaresbrook**, in Essex, has an extremely fine piece of water, well stocked; it is, however, a subscription water.

In the **COLNE**, near **Uxbridge** and **Denham**, fine trout abound; but as the river is rented, you must obtain leave to fish, and pay so much per pound for what you take.

The **SURREY CANAL DOCK**, at **Rotherhithe**, contains good jack, roach, bream, perch, and eels; it is a subscription water, and the terms are a guinea annually, or a shilling for each day's sport.

In the **COMMERCIAL DOCKS**, at **Rotherhithe**, eels, bream, perch, pike, &c., abound. You must procure an annual admission-ticket from a director, before you can fish in this water.

#### A LIST OF SOME OF THE MOST CELEBRATED RIVERS OF ENGLAND, WITH THE FISH WHICH MAY BE FOUND IN THEM.

HAVING now described the principal rivers, &c., in the neighbourhood of London, we shall proceed to notice briefly a few others in various parts of the kingdom.

The "stately **SEVERN**," which rises in **Montgomeryshire**, and after running through part of **Shropshire** and **Worcestershire**, passes **Gloucester**, and discharges itself into the **Bristol Channel**, near **King's road**, is a most excellent salmon and trout stream, and likewise abounds with other fish.

The **TRENT** first appears in **Staffordshire**, runs the whole length of **Nottinghamshire**, and falls into the sea south-east of **Hull**. It is well stored with pike, eels, carp, bream, barbel, chub, perch, grayling, roach, and flounders. Several minor streams run into it, such as the **DOVE**, the **SOUR**, the **IDLE**, the **LEANE**, &c., all of which are well stocked with trout and grayling.

The **STOUR**, which rises in **Kent**, and empties itself into the sea near **Sandwich**, abounds with trout, eels, roach, &c.

The **MEDWAY** also takes its rise in, and passes through **Kent**: it empties itself into the sea at **Sheerness**, and is well stocked with eels, perch, pike, flounders, and a few other fish.



The **ITCHIN**, which rises in Hampshire, contains trout, large eels, and many other fish. It runs into the sea at Southampton.

The **ISIS** and the **CHARWELL**, near Oxford, afford perch, roach, and pike, in great plenty.

The **KENNET**, which rises near Marlborough, in Wiltshire, and falls into the Thames near Reading, is an excellent trout stream.

The river **TEST**, in Hampshire, which runs into Southampton Water, is one of the finest trout streams in England; grayling may also be found in it, in the neighbourhood of Houghton.

The **EX** rises in Somersetshire, passes Tiverton and Exeter, and discharges itself into the sea at Exmouth. It is well stocked with salmon, trout, eels, &c.

The **WYE**, which rises in Montgomeryshire, passes Hereford and Monmouth, and falls into the Severn below Chepstow, is stored with trout and grayling.

The **OUSE** abounds with pike, bream, eels, perch, &c.: this river rises in Oxfordshire, and after passing by Buckingham, Bedford, Huntingdon, and Ely, empties itself into the sea at Lynn, in Norfolk.

The **CAM** rises in Cambridgeshire, passes by Cambridge, and finally blends itself with the Ouse: it is well stored with carp, pike, roach, eels, perch, &c. There are several **MERES**, or pieces of water, in the vicinity of this river, stocked with tench and other fish.

The little **TEME** and the **CLUN**, near Downton and Shropshire, abound with trout and grayling.

#### LAWS RELATIVE TO ANGLING.

By an Act of Parliament passed in the 7 & 8 George IV. for consolidating and amending the Laws relative to Larceny, &c., it is provided "That if any person shall unlawfully and wilfully take or destroy any fish in any water which shall run through or be in any land adjoining or belonging to the dwelling-house of any person being the owner of such water, or having a right of fishery therein, every such offender shall be guilty of a misdemeanour, and, being convicted thereof, shall be punished accordingly; and if any person shall unlawfully and wilfully take or destroy, or attempt to take or destroy, any fish in any water not being such as aforesaid, but which shall be private property, or in which there shall be any private right of fishery, every such offender being convicted thereof before a Justice of the Peace, shall forfeit and pay, over and above the value of the fish taken or destroyed (if any), such sum of money not exceeding five pounds as to the Justice shall seem meet; provided always that nothing herein before contained shall extend to any person

angling in the day-time; but if any person shall, by angling in the day-time, unlawfully and wilfully take or destroy, or attempt to take or destroy, any fish in any such water, as first mentioned, he shall, on conviction before a Justice of the Peace, forfeit and pay any sum not exceeding five pounds; and if, in any such water as last mentioned, he shall, on the like conviction, forfeit and pay any sum not exceeding two pounds, as to the Justices shall seem meet; and if the boundary of any parish, township, or vill shall happen to be in or by the side of any such water, as is herein before mentioned, it shall be sufficient to prove that the offence was committed, either in the parish, township, or vill named in the indictment or information, or in any parish, township, or vill adjoining thereto.

"And be it enacted, that if any person shall at any time be found fishing against the provisions of this act, it shall be lawful for the owner of the ground, water, or fishery, where such offender shall be so found, his servants, or any persons authorised by him, to demand from such offender any rods, lines, hooks, nets, or other implements for taking or destroying fish, which shall then be in his possession; and in case such offender shall not immediately deliver up the same, to seize and take them from him for the use of such owner; provided always, that any person angling in the day-time against the provisions of this act, from whom any implements used by anglers shall be taken, or by whom the same shall be delivered up, as aforesaid, shall, by the taking or delivery thereof, be exempted from the payment of any damages or penalty for such angling."

By another act passed in the 7 & 8 George IV., it is provided that "if any person shall maliciously in any way destroy the dam of a fish pond or other water, being private property, with intent to take or destroy any of the fish in the same; or shall maliciously put any noxious material in any such pond or water with intent to destroy the fish therein, such offender shall be guilty of a misdemeanour, and be punished accordingly."

The provisions of these acts do not extend to Scotland and Ireland.

#### HINTS FOR ANGLERS.

It is generally understood that when two or three persons are angling in the same stream, there shall be a distance of thirty yards between them.

If the learner wish to become a *complete* angler, he must use fine tackle; as the skill and care which such tackle requires will soon make him a master of the art.

When the tackle breaks, the angler must not repine at the accident, but do his best to remedy it, by speedily repairing the damage, and resuming his sport.

The angler should wear strong boots or shoes, and keep his feet dry. Boots and other water-proof articles, prepared by Macintosh, are much recommended.

If the weather be very cold, or the wind sets very strongly from the north or east, the angler will meet with but little sport. Heavy showers of rain or hail, and thunder-storms, are likewise extremely prejudicial to his amusement; and as in the winter months, few opportunities are afforded for the exercise of his art out of doors, he should then attend to all the little repairs which may be necessary to his various appurtenances :—

His hooks, his lines, peruse with careful eye,  
Increase his tackle, and his rod re-tie.

GAY.



## RABBITS.



"Conies they were also playing,  
That comen out of their clapers,  
Of sundry colours and manners,  
And maden many a tourneyng,  
Upon the freshe grass springing."

ROMAUNT OF THE ROSE.—CHAUCE.

### RABBITS.

RABBIT-KEEPING is a pursuit in which many lads take great interest, and it is certainly an agreeable occupation for their leisure hours. Some boys are satisfied with keeping common rabbits; whilst others, more refined in their taste and choice, stock their little rabbitries with the more expensive fancy rabbits. It is not indispensable that the young fancier should procure first-rate animals, when he lays in his stock; as he may purchase

(201)

very good rabbits deficient in one property or the other, but which will produce first-rate young ones, often at much less than a fourth of what would be asked for them, were they perfect in all their properties. Fancy rabbits are rather more delicate, and require a little more care in their management, than the common ones; but as they want neither more nor better food, the extra trouble of keeping them is worthily bestowed.

#### THE WILD RABBIT.

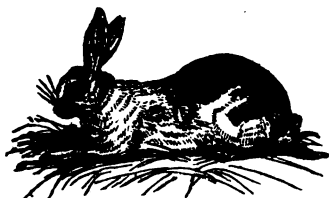
ALTHOUGH rabbits in a wild state are at the present time abundant in this country, they appear to have originally belonged to a more sunny climate; and to have been first known in Africa, from whence they were introduced into Europe through Spain: this latter opinion is in some measure confirmed by representations of rabbits occurring on the early coins of Spain, as symbolical of the country. The rabbit must have been brought into England at a very early period; for we find one of the favourite diversions of the people in the middle ages was to let these animals loose, amongst crowds of spectators, for boys to hunt; and the methods then in use for snaring and taking them alive, were similar to those employed at the present day.

Though the wild rabbit in its general appearance greatly resembles the hare, yet the two species never intermix, nor inhabit the same tracts of country; the rabbit dwelling in burrows or holes which it makes for itself in banks or broken ground, generally in a district where the soil is of a sandy or gravelly nature; whilst the hare chooses its retreat beneath some low bush, fern, or other slight shelter, on rich and somewhat flat and dry ground. Rabbits are destroyed in immense numbers, by various methods, of which ferretting is one of the principal: a ferret, muzzled, and having a bell fastened round its neck, is turned into one of the chief holes, which is then, with all the surrounding ones, carefully covered over with little purse-shaped nets, firmly secured by means of wooden pegs; the harmless inmates of these burrows, terrified by the appearance of their natural enemy, immediately rush to one of the openings, where they become entangled in the net, and fall at once into the warrener's clutches. Hunting them with dogs, is another method of destroying rabbits: terriers and spaniels are generally used for this sport, which is mostly carried on in the autumn, when the crops have been gathered in; and as the little animals lie at that period of the year frequently in hedges, often at some distance from a burrow, they rarely escape from the attacks of two or three active dogs. Great numbers also fall by the sportsman's gun.

The wild rabbit is amazingly prolific, breeding six or seven times a year, and producing from five to seven, eight, or nine,

young ones each time; but from its numerous four-footed and flying enemies, as weasels, foxes, polecats, eagles, falcons, kites, &c., the effects of damp, and the singularly unnatural propensity of the old bucks to eat up the little ones, the race is prevented from increasing to an obnoxious extent. The most beautiful variety of the wild rabbit is that brought from the vicinity of the city of Angora, in Asia Minor, and from thence called the Angora Rabbit: it is covered with long silky hair or fur, which, when dressed, forms a valuable article of commerce. Coquet Island, off the coast of Northumberland, is stocked with this highly-prized variety.

#### THE TAME RABBIT.



ONE principal object in keeping common rabbits, being the supply for the table, those kinds which are best in point of flavour are as much in request as those which excel in shape and colour. The large white, and yellow and white rabbits, possess superior delicacy of flesh; but some persons, ima-

gining that the gray, and some of the black ones, closely resemble the wild rabbits in flavour, give those colours the priority; whilst others maintain that the large hare-coloured variety, from being like the hare in flavour as well as form and hue, is to be preferred.

In selecting rabbits by form, those should be chosen which are short-legged, full-bodied, and wide-shouldered; as they are considered to fatten in a shorter time, to breed better, and to be more hardy, than other kinds. Common rabbits vary in colour; some being entirely black, others white with red eyes, others mouse-colour, others fawn, some brown, and some gray with tawny feet. Persons who are particular with respect to the colours of their rabbits, should endeavour to ascertain the colours of the does from which their stock came; for it often happens that rabbits produce litters in which not one young one of their own tint can be found: thus, if a cross of gray happen to be in the stock some four or five generations back, it may appear again, although all your breeding rabbits are of other colours. Gray is the worst of all colours, in the opinion of the fancy, and the most difficult to get rid of; yet it does not always happen that gray rabbits throw litters of their own colour.

To choose does for rearing, take the largest from those rabbits which have the fewest in their litters; as it is supposed that when the does have but few at a time, the young ones are most likely to turn out fine; let the little ones remain with their mothers until they are about six weeks old, when take them away, and keep them in hutches,—two together,—for about the same period; and as they become quarrelsome in their dispositions when near four months old, they must then be separated, and kept in different hutches. In lifting your young rabbits, take hold of them by the ears, and place one hand under the lower part of their backs, for it is injurious to handle them too much.

The does will breed at the age of six months: but it is better that they and the bucks be ten or twelve months old before they are first put together; the rabbits should not be left together for more than ten minutes. The doe goes with young thirty days, and toward the time when she may be expected to kindle, fresh hay or oat-straw, or both, should be given to her for a bed; when she nibbles the hay or straw into little bits, it is a proof that she is with young; and a few days before kindling, she tears the soft flue or fur from her body, to make a snug nest for her little offspring. Some fanciers are of opinion that if the litter be large, and there are any very small or weakly rabbits in it, they should be destroyed immediately their defects manifest themselves. This may be sometimes expedient; but, unless the little ones appear to be particularly weak and sickly, rear the whole litter, if possible. When a doe has a large number of young ones, at a kindle, and another but few, equalize the number for each to rear.

About six weeks after kindling, the old rabbits may be put together again; but, if the doe have had a large number of sucklings, a longer period should elapse. If the doe be weak after kindling, a malt mash, made of fine pollard scalded, or barley-meal with a small quantity of cordial horse-ball mixed up with it, will be found beneficial. Bread soaked in milk and then squeezed rather dry, will also strengthen her materially, if she can be made to eat it. Those fanciers who keep their rabbits mewed up in hutches, should not let their does have more than four litters in a year. It is necessary to protect the young rabbits from the old bucks, otherwise they will be devoured; and as rats and other vermin are particularly fond of such delicate morsels, it is requisite to construct the hutches so as to keep out these marauders. If you have a doe who possesses so little maternal affection as to destroy her young ones, fatten her at once for the table, for there can be little hope of her rearing any of her offspring; but it is, of course, necessary to ascertain her guilt before you condemn her, as it may be that some prowling rat is the real culprit.

To the feeding of his rabbits, the young fancier must pay the greatest attention: they should be fed twice a day at least; that is, early in the morning and in the evening, and, according to the rule of many fanciers, in the middle of the day. Avoid giving them too much food; else they will waste that which they cannot eat on the instant. The most suitable food is the delicate tops of carrots, celery, parsnips, hare-parsley, and furze; the leaves and roots of white beet, stalks of dandelions, milk-thistles, and lettuces; fine grass, clover, tares, coleworts, and cabbages; apples, pears, pulse, corn, and Jerusalem artichokes. The cabbage and colewort leaves should be given with discretion, as they are apt to disagree with the animals; in fact, too much succulent food is injurious, being likely to produce a disorder termed *potbelly*. To guard against this, a due proportion of dry food, such as fine fresh hay, pea-straw, or corn, should be frequently given with the moist vegetables. In London and its vicinity, grains form a principal article in the bill of fare for rabbits; and when they are dieted on such food, cabbages, turnip-tops, or colewort, should be very sparingly given; the grains, however, when mixed up with pollard, oatmeal, bran, and split-peas, form excellent and wholesome food. When greens, roots, or grains are not at hand, the corn may be slightly moistened with water or milk; indeed, during a dearth of fresh vegetables, a small quantity of tea-leaves, squeezed tolerably dry, will be found to agree well with the rabbits. Some fanciers give a table-spoonful of water, beer, or milk occasionally to their rabbits, when corn forms the chief part of their aliment. Rabbits accustomed to live chiefly upon bran, or any other kind of dry food, will eat with avidity the parings of turnips, apples, or pears. Potatoes, either boiled or roasted, (but not raw) may be given amongst other food. When a doe has a litter by her side, soak the split or whole gray peas for a few hours before they are put into the trough; and if peas be given to recently-weaned rabbits, they should also be soaked. Although we recommend the food to be given, generally, in such quantities only as the animals can eat in a few hours, yet when a doe is about to litter, she may have somewhat more allowed her; and when she suckles, she will require nearly twice as much as at other times. As soon as the young ones can begin to nibble, they must be supplied with food, three times a day, punctually. If the aim be to fatten rabbits for the table, the best age to put them up, is from five to eight months; and the most suitable food is, perhaps, barley-meal, oatmeal, or split-peas, or a mixture of them, with the addition of a little sweet hay. A table-spoonful of water per diem may be added; and a small quantity of carrot-tops, sweet marjoram, parsley, and basil, may also be given daily, with advantage. The more varied the food for fattening,



the better; but when the animals are once full-fat, as the breeders express it, they often pine away, and lose their plumpness. Experience alone will regulate the exact quantity of food proper for each rabbit. If the little fatlings can be allowed to disport themselves in a paved yard, for an hour or two, in fine weather, it will add much to their general condition and health.

The most careful attention should be paid to the feeding of the captive pets; for it would be extreme inhumanity to neglect the little creatures, whose existence depends upon the supply of food afforded to them; and who, if perishing from lack of nourishment, cannot escape from their captivity, and seek a better home elsewhere.

#### FANCY RABBITS.

THE fancy in rabbits, like all other fancies, is extremely liable to the caprices of fashion: some years ago, a very fine common rabbit of two colours was esteemed a fancy one; but now a rabbit must possess certain properties, (many of which are never found in the common kinds,) before it can be classed and valued as a fancy specimen: these recommendations consist in a perfectly symmetrical shape, good arrangement of colours, full dewlap, and a peculiar position of the ears. A rabbit must have what is termed a "good carriage:" that is, its back should be finely arched, and its head held so low, that its muzzle and the tips of its ears may almost touch the ground. Many fancy rabbits have their fore-legs bent very much inward; but this, although it appears a deformity, is not of importance, neither does it lessen the value of the animal.

The correct arrangement of colours is a very important point. Rabbits are divided into three varieties, distinguished by the colours of their fur: these are, the lead, or, as it is technically called, the blue-coloured and white; the black and white; and the tortoise-shell: and these varieties are again subdivided into three classes, from the arrangement of the spots of colour on their faces, termed the single, double, and butterfly smuts: of these, the latter is the most valuable. The single smut is a solitary patch of a dark colour on one side of the nose; the double smut, a spot on each side; and the butterfly smut, a spot on each side of the nose, with a dash of colour on the nose, forming altogether a slight resemblance to a butterfly, whence the name. If a black and white rabbit's face be ornamented in this manner, it is said to be a black butterfly smut; and if a lead-coloured rabbit show this mark, it is called a blue butterfly smut. It is not indispensable that a fancy rabbit should possess these markings; but if

it do, its value is, of course, enhanced. Other marks must likewise be well defined upon the rabbit, ere it can be esteemed as a perfect fancy one: thus, a patch of dark colour should be on its back, this is termed the saddle; its tail must be dark, and dark stripes also on each side of its body, in front, which from their passing backward so as to meet the saddle, and, as it were, form a collar, are styled by the fanciers the chain; the animal's throat may be mottled with dark-colour and white, but its legs and belly must be of snowy whiteness. The spots of colour must not be grizzled, or have many white hairs amongst them, else the beauty and wholeness of the animal's colour are much diminished; neither should the saddle terminate abruptly, but have its edges broken by dark spots, lessening gradually in size, and ending with the chain on the shoulder; these spots, of course, must also be free from white hairs. It seldom happens that rabbits exactly perfect in point of colour can be procured, perhaps, scarcely one in a hundred; the nearer they are to the rules, however, the more they are valued, at least in as far as the property of colour is concerned. It sometimes happens that very good does produce young ones which are merely touched with dark colour; that is, with only a spot or two round the eyes and on the back, and perhaps a dark nose: these little ones are generally weakly, rarely fatten sufficiently for the table, and, if perfect in other properties, are worthless for replenishing the stock.

The dewlap is peculiar to fancy breeds, and is highly prized: it is a protuberance formed of skin and fat, and is not developed until the rabbit has nearly attained its full size; it commences immediately under the jaw, extends downwards in front of the chest, and ends between the fore-legs; it is indented in the middle, and is frequently so large that when the animal is in a state of repose, with its head drooping, it projects on each side and beyond the chin.

The ears, the most striking peculiarity of the fancy breeds, must be perfect according to the fancier's rules: these are, that they must never measure less than fourteen, nor more than seventeen inches in length from tip to tip, measured across the head, except for the ear-lop variety, when the extreme length may be eighteen inches; in colour, the ears must always be like the darkest tints of the fur on the body,—if darker, so much the better; and, of course, perfectly free from white markings; for if any light spots break the beautiful tone of colour, they produce a pie-bald appearance, which is a great defect. Fanciers reckon three grades between the common up-eared rabbit, and the flat or perfect lop: these varieties are the half-lop, the forward or horn-lop, and the ear-lop.



It being important that the ears of the fancy rabbit should correspond with each other, not only in shape, but in direction, the **HALF-LOP**, from its having one ear upright, and the other pointing downward, is the least in estimation, even if it be well shaped and beautifully marked. However,

as this variety is generally well bred, if their colours and shape tally with the rules, they may be kept for breeding with advantage, as they not unfrequently throw first-rate lops. Some fanciers affix a piece of lead to the tip of that ear which stands upright, in order to weigh it down, and so by degrees accustom the rabbit to hold it in such a manner as to match the other; but this plan occasions the poor animal pain, and very rarely succeeds.



A rabbit is termed **HORN-LOPPED** when its ears descend obliquely forward, from the side of the head. This peculiar carriage of the ears is held in rather more estimation by some fanciers than the preceding; and it is worthy of notice, that almost all horn-lops occasionally raise one

ear upright, and so resemble the half-lops.



The next style of carrying the ears is that of spreading them out horizontally on each side, when the rabbit is termed an **OAR-LOP**; and such animals are considered very valuable, if correct in their different properties. Many of the best bred bucks are

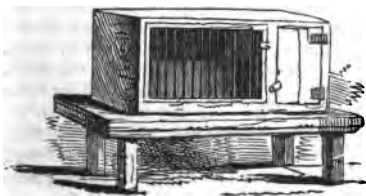
oar-lopped, and the same may be said of numbers of excellent does; for a good rabbit of the perfect lop kind often carries one ear correctly, and elevates the other nearly enough to entitle it to be classed among the oar-lops.



The **FLAT** or **PERFECT LOP** is the most valuable of all the fancy strains, as this carriage of the ears is the reverse of the natural position. The ears of a first-rate lop must be so turned, that the hollows of them be backward, and the outer or convex part in front;

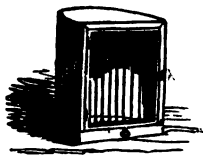
and that they correspond with each other in fall; and the closer they keep to the side of the cheek, the more beautiful the animal is reckoned. Five, and ten guineas, and even more, have been paid for particularly fine specimens of this variety of rabbit. If a fancier possess ten or twelve does, all of them perfect, or nearly so, in their properties, he may consider himself fortunate if they produce 'him half-a-dozen first-rate lops in a season, for he must not expect that all the young ones in a litter will be perfect; as it generally happens that only one or two turn out of any value, the others being deficient either in colour, or in the position of the ears. Although it is impossible to insure the continuance of a fancy strain through all the litters, yet the utmost precaution should be taken for that purpose. The bucks and does should, therefore, be of the best blood: the does should not be allowed to kindle more than three or four times a year; nor rear more than five in a litter if they produce more, and those only the most promising. The food should also be the most nourishing which can be produced. Amongst the fancy rabbits, we must not omit the French variety distinguished by having long curly hair. By some persons, this breed is supposed to be a cross, between the beautiful rabbit of Angora, and the common white species.

#### RABBIT HUTCHES AND HOUSES.



Rabbit hutches should be made very neatly, not merely for the sake of appearance, but for cleanliness. As it is not in every lad's power to obtain well finished hutches, comfortable, though homely looking ones, may be easily constructed out of egg-chests, or old tea-

chests; the former will serve as habitations for the does, and the latter for the bucks, or for weaned rabbits. The doe's hutch should be a foot and a half, or two feet high, about two feet deep, and at least three feet six inches long; about one third of this length should be partitioned off for a sleeping apartment; an aperture should be made in the partition, of just sufficient dimension to allow the doe to pass through with facility; and a sliding panel, or hanging door, over this hole, will be found useful for confining the rabbit in one division, while the other is being cleansed. The edges of this aperture must be cased with tin, as rabbits are fond of nibbling any wood-work within their reach. The front of the hutch may be composed of two doors: that is, a door or framework of wood, with iron wires placed perpendicularly, about three quarters of an inch asunder, is made to fit from one end of the front to the before-mentioned partition; and another door of wood without wires, extends from the partition to the other end. These doors must open in contrary directions, for which purpose the hinges of each door should be fastened at the extremities of the hutch; and that one may be opened without the other becoming unfastened also, two buttons must be put on the partition, as shown in the illustration. The wired door should not be so deep as the wooden one, as a drawer for food will be required to slide underneath it. The edges of the feeding trough should be cased with tin; and as some rabbits scratch their food out of the trough, and dung in it, to prevent this, let the front edge of the trough be bevelled off, and a piece of thin board an inch in width, cased with tin, be fastened so as to project over the top of it. The floor of the hutch should be of smoothly planed wood, and made to slope toward the back, along the whole length of which a narrow slit should be made to let the urine run off; a large smooth slate, however, makes a sweeter and better flooring than wood, besides which, it can be more easily kept clean. Some persons are of opinion that bucks and weaned rabbits should be kept in small hutches, without a sleeping apartment; whilst others, and we are of that number, contend that they thrive best when they have double rooms.



The buck's hutch is usually made about two feet and a half broad, one foot eight inches in height, and one foot eight in its deepest measure; in shape it differs considerably from the doe's, and may be easily understood by reference to the annexed figure. It is not divided by a partition, neither is there a drawer for food running the length of the front, this receptacle being placed in the centre of a cross-piece, reaching from side to side; the

door which composes the whole front of the hutch, must have very strong hinges, and the button to secure it be firm in its fastening; the wires should also be stout, and they may be set rather wider apart than in the door of the doe's hutch. The back of this hutch is nearly semicircular in its form, and an opening must be made at the lower end for the purpose before described. The hutches, if many rabbits be kept, may be piled one upon the other, but none of them ranged upon the ground; the lowest being placed on a stand about two feet in height, to preserve the inmates from rats, &c.; and as still further defence against such intruders, circular shields of tin, about the size of a common plate, may be affixed to the legs of the stand. The backs of the hutches should not be put close to the wall, but at a short distance from it, that the excrement may pass, and be cleared away with facility. If the animals be allowed the range of an out-house, it will be requisite to stop up all holes in the brick-work and flooring with little bits of brick, or tile, and cement, and then coat the flooring with cement, to keep out the rats. The rabbitry should be thoroughly dry and well ventilated, not only when the doors and windows are open, but also when they are shut, as during cold wet weather: the best proof of the ventilation is the atmosphere of the house when you first enter it in the morning; and if there be any strong or unpleasant smell, there is not a proper circulation of fresh air, and an additional opening must be made, which may be suffered to remain open by day and night; all such openings, windows, &c., should be protected by fine wire lattices, and so disposed that no draught blow directly through the place; for if the animals be exposed to chilling currents of air, the young fancier must not expect that they will thrive. The feeding trough should be a heavy affair, made of brick-clay; for by being weighty, it is not so likely to be overturned. An artificial burrow for the doe to form her nest in, should not be omitted in a rabbitry; but this contrivance must be left to the ingenuity of the youthful proprietor, and the means at his disposal. If a little space of ground can be allowed in front of the rabbitry for its inmates to sport about in during fine weather, it will be of great advantage to them.

#### DISEASES.

CARE in selecting the food, regularity in the hours of feeding, and attention to the general cleanliness of their habitations, will in a great degree preserve rabbits from disease. From the great value of the fancy strains, they deserve, when suffering from any malady, much attention and all the remedies which experience has proved to be the most efficacious; but the common breeds of

rabbits are scarcely worth the trouble, their real value being so trifling; the best plan, perhaps, is to get rid of them as soon as possible.

**HOARSENESS** is a disorder which arises from the rabbits having fed too plentifully upon succulent, green food; and its symptom is that the animal's dung is moist and discharged too often. A liberal allowance of solid food, such as barley-meal, oatmeal, bran, &c., is the best remedy, with a sprig of parsley, or fennel, and a small quantity of meadow hay, occasionally; two table-spoonfuls of water, and not more, per diem, may also be administered, as likewise oatmeal and green peas made up into a stiffish paste.

For the **LIVER COMPLAINT**, there is no remedy: the only thing which can be done is to promote the health of the animals as much as possible, by keeping their houses and hutches warm, dry, and clean; for everything which adds to their general health acts as a preservative against attacks of this disorder.

The **SNUFFLES** are occasioned by damp and cold: the rabbits must then be carefully dieted and secured from damp, and variations of the atmosphere; boiled potatoes and bran, made into a paste, or barley-meal, or oatmeal, and ground peas mixed up into a stiff paste, with a little milk or water, will be found the best food; and no water nor green food of any kind should be given. As the animals recover, their diet may be changed by degrees; giving at first a little clover or meadow hay, and slices of carrot; and then, gradually, the vegetables to which they have been accustomed.

**POT-BELLY** is a disorder to which most young tame rabbits are subject: the symptoms are, enlargement of the belly, and weak and poor appearance of the sufferers. The restoratives are air and exercise, which they should, therefore, be allowed whenever an opportunity offers. Much dry food, and a very small allowance of water, prove likewise beneficial; and the only vegetables which can be given with safety, are carrots and parsnips. Unless the poor animals are soon cured, they die.

**RED-WATER** is a complaint of the kidneys, frequently caused by wrong food, or damp and cold. The rabbit suffering from this malady must be put into a warm, dry, comfortable hutch, and supplied with oatmeal, bran, baked or boiled potatoes, &c.; two or three table-spoonfuls of water in which bran has been soaked, may be given every day; and in the summer, a few leaves of the milk-thistle and lettuce will be of service.

#### LAWS RELATING TO RABBITS.

By the common law, if rabbits come on a man's ground and eat his corn or herbage, he may kill them. By the 7 & 8 Geo.

IV. c. 26, sec. 36, if any person wilfully and unlawfully in the night-time, take or kill any rabbit in a warren, or place kept for breeding rabbits, whether inclosed or not, he is guilty of a misdemeanour; and if in the day-time, the offender shall forfeit such sum not exceeding five pounds, as to the justice by whom he may be committed shall seem meet.





## THE SQUIRREL.



—“A nimble squirrel, from the wood,  
Ranging the hedges for his filbert food,  
Sits partly on a bough, his brown nuts cracking,  
And from the shell the sweet white kernel taking.”

WILLIAM BROWNE.

### THE SQUIRREL

Is decidedly one of the prettiest and most engaging little pets that can be kept. The elegance of its form, the harmlessness and vivacity of its disposition, and, above all, the ease with which it may be tamed, render it an universal favourite. Though naturally a wild and timid animal, when caught young, it soon becomes so completely domesticated, that it may be allowed to run loose about the room, or even the garden, without its evincing the least inclination to return to its natural, wild state; after gamboling and frolicking about for a time, it will come back, when called by name, to its protector, and crawl over him, nestle in his bosom, and display other signs of the strongest attachment. When taken and bred from the nest, it may be taught to perform a variety of amusing little tricks, such as to dive into the pockets of a person for a nut; to run after one thrown along the ground, like a dog; to turn over heads and heels; to jump over a stick, or from one hand to the other when held a considerable distance

apart; besides many other gambols. Indeed, the squirrel has all the docility, as well as the affectionate disposition, of a dog; it will recognise as soon the person of its master, and display the same fondness and attachment to him.

The colour of the squirrel is bright brown, inclining to red on the underneath parts; the breast and belly are pure white; the eyes full, black, and lively in their expression; the ears are fringed with long tufts of hair; the toes are slender, and deeply divided; the claws curved and exceedingly sharp.

It uses its fore paws in conveying food to its mouth, sitting in an upright posture on its hinder ones. Its length from the nose to the insertion of the tail is about six inches; the tail itself, which is more than as long again, is thick and bushy with hair, and constitutes one of the principal ornaments of this beautiful little creature; when sitting erect, this is raised over its head, the top being slightly turned back again, so as somewhat to resemble the letter S. In this position, it not only contributes greatly to the elegance of the little animal, but forms also a kind of natural shelter from the wind, to which it has a particular aversion; in the winter too, when coiled round its body, it must be a great protection against the cold; it is also of assistance to the squirrel in making its prodigious leaps from bough to bough, by adding to its buoyancy.

Its food consists of various sorts of fruit, particularly of the nut kind,—walnuts, cheanuts, filberts, almonds, hazel-nuts, acorns, beech-mast, and the cones of the fir-tree. In the absence of these, during the summer, it subsists principally on the tender buds and shoots of trees; it lays up a store for the winter provision in the holes and fissures of trees in the vicinity of its nest.

The squirrel lives chiefly in woods, among the topmost branches of the trees; it leaps from bough to bough with amazing agility, clearing the most incredible distances at a single bound; it seldom descends to the ground, except to procure moss, grass, and other materials for its nest; and then, never wanders far from the neighbourhood of some tree, up which, on the slightest approach of danger, it springs with the rapidity of lightning, the smoothest bark being easily mounted by means of its sharp little claws.

It breeds once a year, about the middle of June, and produces three or four young ones at a time. Its nest, composed of bits of stick, moss, hay, dry leaves, hair, &c., is large and round, covered with a sloping roof, to keep out the rain, the whole so firmly knit together, as to be capable of withstanding violent storms; it is generally built in the fork of the branches of a lofty oak or fir tree; an old crow's or rook's nest is also sometimes made use of by the squirrel, after a little alteration; and occasionally, the hollow of some decayed tree.

Many country lads go out in little parties in the summer time, for the purpose of plundering squirrels' nests of the little ones; but this is rather a dangerous amusement, not only from the care and expertness requisite in climbing to the lofty situations in which the nests are generally placed, but from the spirited attacks of the mother, who frequently displays resolute courage in defence of her offspring. She will fly at the face of the spoiler with great ferocity, assail him vigorously with her sharp claws, and frequently compel him to retreat, happy to escape with eyes uninjured. When thus exasperated, the mother-squirrel is really a formidable opponent; as she never desists from her attacks, until she has either succeeded in repelling her enemy, or has perished in the attempt.

There are various kinds of cages made for squirrels: these range in price from five shillings to two or three sovereigns, or even more. The one most in use is the circular-topped cage,



represented in the cut. It has a little sleeping-box, which opens with a lid, so that the bed may be changed, and the place cleaned out without difficulty: this communicates with the open cage

by a hole just large enough to admit the body of the animal, and furnished with a sliding door, so as to be stopped up or left open at pleasure. The outer cage is fitted up with a sliding bottom and small tin trough for food; the edges of the woodwork must be carefully covered with tin, otherwise the little tenant by continual gnawing would not only greatly disfigure the cage, but eventually effect his escape. The revolving or turn-about cage is often used, but this is decidedly objectionable: the motion is an unnatural one, and must, therefore, subject the poor little prisoner to torment. If there be one method more efficacious than another of depriving the poor squirrel of liberty, it is this very contrivance, whereby, do what he will, he never can possibly be in a state of rest; for, let him vary never so little, even for a moment, from his central position, everything begins tumbling about his ears. "I have many times," says a humane writer, "observed with pity the panting sides of an unfortunate animal; its state of anxious tremor, its hall of torment; its breath exhausted by galloping, kicking, and straining; worried and alarmed, without enjoying a single inch of progressive motion, or one refreshing change of attitude, for minutes together, within his tantalising turn-about treadmill." Squirrels are sometimes kept fastened by a small brass collar and chain, like a dog, to a little box or kennel, with a platform in front: they must, however, be thoroughly tamed before they can be kept thus, otherwise by their continual efforts to escape, they are liable to strangle themselves. The cage should be cleaned out regularly every day, to prevent its getting

offensive, and a little bird gravel sprinkled on the bottom. The sleeping-box should be furnished with some sweet hay, moss, &c., and with a little wool about the breeding-time.

Squirrels should be kept on the same sort of food they obtain when in their natural state; bread and milk may also be added, but it must be fresh and sweet. They may be purchased of most bird-fanciers, for about four or five shillings; when very tame, higher prices are asked—sometimes as much as fifteen shillings or a sovereign. Numbers are also brought up to London by country market-people, and sold in the streets at very moderate prices.

In purchasing a squirrel, be careful to select a young one: when taken old, they are sulky and morose in disposition, and almost incapable of being tamed, besides being far less beautiful in their appearance; they may easily be distinguished from the young one, for they are larger in size, have stouter limbs, are of darker colour, more inclining to sandy-brown, with less of the reddish tinge in it; their teeth are also larger and stronger, and perfectly yellow, and their tails by no means so full and bushy as those of young animals.

In summer, the fur of the squirrel is coarse, shining, and of a bright rufous colour; the ears are deficient of the ornamental tufts, which grow in autumn, while the animal is renovating its coat, and continue, usually, till about the beginning of July, the time varying somewhat in different individuals. In winter, its fur is much finer in quality and texture, considerably longer, thicker, and more glossy, and nearly of a greyish-brown hue. The first young ones, which are produced very early in the season, push forth the winter garb, which they retain throughout the summer; whereas, the second race of young ones, which, for the most part, make their appearance about midsummer, are first clad in the summer dress, which is exchanged, before they have become half-grown, for that of winter.



## THE DORMOUSE.



### THE DORMOUSE

Is less attractive as a domestic favourite than the squirrel; indeed, beyond the beauty of its fur, and the perfect harmlessness of its disposition, it possesses little recommendation to our notice.

In size, it is rather larger than the common mouse; the colour is a light brownish-red, inclining to white on the underneath part, particularly on the throat, where it is almost pure white; the eyes are large and black; the tail long, and thickly covered with hair.

It is perfectly harmless and inoffensive in its temper, displaying neither aversion for those who annoy, nor affection for those who caress it. It is by no means shy, but soon becomes domesticated, and will suffer itself to be handled freely, without evincing the slightest displeasure. Like most of the mouse tribe, it has four front teeth, but it seldom makes use of them as a means of defence. It builds its nest with grass, moss, dry leaves, &c., in the thickest parts of some strong quickset hedge, generally near the bottom, where the root divides off into a number of small upright branches; and its nest so resembles the clump of dry leaves usually collected there, as to escape being noticed except on the strictest search; even when discovered, it is so completely protected by the cluster of stems, that unless these are cut through, it is a matter of difficulty to secure it, without doing injury to the little ones, should any happen to be inside. The dormouse feeds on all sorts of fruit, acorns, beans, peas, and even corn. During the winter, it remains in a state of torpor, in preparation for which,

(218)

towards the end of autumn, it makes itself a small round compact nest of the sharp prickly leaves of the fir-tree, just large enough to contain its body; into this it creeps on the approach of cold weather, and remains tightly coiled up in the form of a ball, till reanimated by the genial warmth of spring. An occasional fine day, however, in winter will revive it, and tempt it from its retreat; but the returning cold quickly compels it to resume its former state. Moderate warmth will always restore it to life, but sudden exposure to the heat of fire destroys it. Whilst in this state of torpor, it appears to possess but little more warmth than any inanimate object, and to be nearly deprived of all susceptibility to pain. Sometimes, they awake from their winter nap, and revived by the heat of the captor's hand and the warmth of the room, leap from chair to chair with great agility; and though but just caught, they are not alarmed at being taken into the hand.

Dormice breed but once a year, and bring forth four or five young ones at a litter: they are born blind; but, in a few days, the eyes are opened, and in a short time they are enabled to seek their food, independently of the parents' care.

Dormice are usually kept in pairs, in cages similar to that for the squirrel, but smaller. They may be fed on all sorts of fruit, especially of the nut kind; a little bread and milk may also be given them, fresh every day. Their cages must be kept perfectly clean; the sleeping-box should be furnished with some soft moss or hay, to which a little cotton may be added when the females are about to litter. The male is seldom known to devour the little ones, and therefore need never be separated from the female. During winter, they should be kept in a warm room, when they will remain in an active state all the year round, like most other animals; if allowed to sleep overmuch, they frequently bite off their tails, thereby considerably detracting from the beauty of their appearance.

They may be bought of all bird-fanciers for about eighteen-pence or two shillings a pair. In the winter time, when the cold has driven them to their nests, they may be found in great numbers in the hedge-rows; the bushes being then stripped of foliage, their little hiding-places are exposed more readily to view, and the harmless inmates falling easy victims, awake from their long sleep to find themselves the unwilling tenants of a schoolboy's cage; their native haunts among the nut bushes and fruit trees of the orchard being changed for the wire walls of their narrow prison-house.

## WHITE MICE.



### WHITE MICE.

**THERE** are few lads who have not, during some portion of their school days, amused themselves by keeping these pretty little creatures. The moderate sum for which they may be bought, and the trifling expense incurred in keeping them, place them within reach of almost every schoolboy's pocket; while the constant amusement they afford by their innocent antics, and the tameness and docility of their nature, amply compensate for the little trouble they require at his hand. So well must they be known to all our young readers who possess the slightest love for natural history, that a few remarks on the mode of treatment, &c., are all that need be offered.

They may be purchased at all bird-shops: eightpence or a shilling are the prices asked for a pair of young ones; after they have had a litter, eighteen-pence to two shillings; the same price is also asked for a doe with four or five little ones. They are exceedingly prolific: six or eight broods are frequently produced by one doe in the course of a year, and from three to eight young ones at each birth. When the female is about to litter, the buck is frequently separated from her, and kept in another cage till the young ones are a week or ten days old, lest he should devour them. This, however, is by no means a common occurrence; but, if the buck have once devoured the young, he will be likely to do so again; though the above precaution need never be resorted to unless he has been once detected.

The cages for white mice are as various in price as they are in form, material, and neatness of execution. A common cage may be bought for a shilling, or even sixpence; and more finished ones at all intermediate prices between that and a sovereign. The usual and most convenient cage is that like the squirrel's on a small scale; the same as recommended for the dormouse. Some are very ingeniously contrived like little houses, fitted up with glass windows, doors, &c.; they consist frequently of two or three stories communicating by small ladders, up which the little animals are compelled to climb to obtain their food, which is generally placed in the uppermost story; other cages are made like small models of windmills, the sails of which are made to turn by means of a revolving cage inside. The common revolving or "turn-about" cage is often used; but it is as objectionable for these little creatures, as for the squirrel. The usual food for white mice is bread sopped in milk, squeezed pretty dry; they are also very fond of oats, and a few may be given them every day. Cheese of any kind whatever, is unfit for them.

Great attention should be paid to cleaning out of the cage, the health of the little tenants mainly depending upon it: it should be done regularly every morning, and that thoroughly; else the smell will be exceedingly offensive; the bed too should be frequently attended to and changed; after littering, however, the sleeping-box should not be opened at all for three or four days. The young ones are able to shift for themselves when about a fortnight or three weeks old.

A very pretty piebald may be obtained by a union of the white with the common brown mouse. There are beside several other varieties of these pretty little animals, such as the black, the black and white, black and brown, fawn-coloured, &c.; but all these being scarcer than the plain white, are much more expensive; a pair of them costing as much as four, five, or even six shillings.

HARVEST MICE, and the long and short-tailed field mice, are also frequently kept by boys as pets, particularly in the country. They are found about harvest-time in great numbers in the corn-fields; their nests also are found in the hay-fields after the grass has been mown. They soon become tame and familiarised to confinement, and have none of the offensive smell that the common species have. They may be kept on oats, beans, peas, nuts, &c. with a little bread and milk.



## THE GUINEA PIG.



THE Guinea Pig is an extremely timid, delicate, docile, and elegant animal; and is very well adapted, by its gentleness and beauty, to be kept as a pet. Though inoffensive in its manners, it seems incapable of feeling the slightest attachment for those who feed and caress it; even for its own offspring, it evinces little or no affection; it will not only suffer them to be destroyed in its presence, without making the slightest effort to defend them, but will even devour them itself. For all useful purposes, Guinea pigs are valueless; their flesh, though forming an article of food in their native countries, Guinea and the Brazils, is considered by no means a delicacy to the European palate; and their skins, notwithstanding the beautiful sleekness of their appearance, have as yet been turned to no account by the furrier. Their only recommendations, therefore, are the gentleness of their dispositions, the cleanliness of their habits, and the beautiful colouring of their coats. In this latter respect, they are very varied; black, white, orange, and mixtures of the three, called orange-tortoiseshell, being the principal varieties; the latter are the most prized, particularly where the dark colours predominate.

In their native country, they are generally of a pure white, with pink eyes; the alteration which has taken place in them in this respect, is, perhaps, to be attributed to change of climate, food, &c.

They possess amazing fecundity,—to a greater degree, perhaps,

than any other four-footed animal. They bring forth six or eight times in the course of a year, and from four to twelve young ones at a birth; beginning at the age of two months. The average number which one female is the means of producing in one year is estimated at six hundred; thus, in a short time, they would increase to such an extent as to set computation at defiance, were there no check to the multiplication of the species.

In its wild state, destitute as the Guinea pig is of means of defence, it falls an easy prey to the smaller kinds of cats, in which its native countries greatly abound; its burrow is its only refuge, and that but a poor protection against many of its pursuers, such as stoats, weasels, &c. In their domestic state, numbers are cut off by cold, wet, and a want of proper attention; and a great many young ones are devoured by their parents at the time of their birth. But, in spite of all these checks upon their numbers, they still increase to such an extent as to render it necessary for the owner to destroy the greater part of the litter himself; leaving but one or two for the mother to rear, that she may not be inconvenienced by her milk.

Rats are supposed by many persons to have a great antipathy to Guinea pigs, and carefully to avoid the place where they are confined. Under this impression, which, however, is an erroneous one, they are frequently kept by fanciers in their rabbit-houses and pigeon-lofts, as a means of protecting their stock against the depredations of these rapacious vermin. They are allowed to run loose about the place, and to shift for themselves; no attention whatever need be paid to feeding of them, the mere refuse scattered about the floor being sufficient for their subsistence.

When, however, they are kept for amusement, their cages are generally made similar to the rabbit-hutch, but of rather smaller dimensions; their treatment too, in most respects, is much the same as that of rabbits. Their ordinary food should be oats given twice a day, and sparingly, that they may not get cloyed, and waste them. Green meat should also form a portion of their usual diet, particularly the wild sorts, as dandelion, sow-thistle, plantain, &c.: they are remarkably fond of tea-leaves, but these should only be given occasionally; they also like fruits of all kinds, especially apples; and bread dipped in milk or water. They are very fond of milk, and never refuse water when offered to them. When they utter a shrill, piercing cry, they are in want of food, &c.

Guinea pigs are sold by bird-fanciers; the prices varying from sixpence to half-a-crown, according to their age, colour, &c.; as before remarked, the dark rich-coloured tortoise-shell specimens are considered the most valuable.

## PIGEONS.



THE STOCK-DOVE.

Cooing sits the lonely dove,  
Calling home her absent love.

CLARE.

THE elegant and varied forms of the different species of doves, their extremely social and gentle habits, and the ease with which they may be domesticated, have in all ages and countries rendered them especial favourites. From time immemorial, they have been considered the emblems of impassioned love and faithful attachment; the fidelity of the turtle-dove to its mate has been sung by almost every poet, and, indeed, is proverbial: their vaunted pre-eminence in these points over other birds, however, is, at the least, questionable; for the eminent naturalist, Blumenbach, observes, "As to the highly-prized fidelity of the turtle-dove, setting aside idle fables, it presents nothing superior to other birds which lead the same mode of life."

●

### THE STOCK-DOVE, OR WILD PIGEON.

As the stock-dove, or wild pigeon, is the original stock whence the different varieties of the domestic pigeon are derived, a short  
(324)

account of it will form a proper commencement to our brief treatise upon keeping and rearing pigeons. The stock-dove is about fourteen inches in length, and in plumage is exceedingly beautiful; its head, neck, and upper part of the back, are of a deep blueish-gray colour, reflected on the sides with green and gold, and that so delicately,

"That none can say, though he it strict attends,  
Here one begins, or there another ends."

Its breast is a faint reddish-purple; belly, thighs, under tail-coverts, and the lower part of its back and rump, a light gray, or ash-colour; primary quill feathers, dusky, edged with white; the others gray, marked with two black spots on the exterior webs, so as to form two black bars across each wing; its bill and legs are red, and its claws black. Stock-doves are migratory birds, visiting England in large flocks at the beginning of winter, and retiring in the spring; some few, however, remain behind, and only change their quarters in search of food. The wild pigeon breeds but twice a year, lays two eggs each time, and commences incubation about sixteen days after laying the second egg.

#### THE TURTLE DOVE



Is one of the prettiest of the species: its bill is brown, and eyes yellow, surrounded by a crimson circle; the back of its head is of an olive-ash colour, and on each side of its neck is a patch of black feathers, margined with white; its back is ash-colour, and each feather tipped with reddish-brown;

wing-coverts, reddish-brown, spotted with black; quill feathers, dusky, with light edges; the front of its neck and the breast, of a pale reddish-purple; belly, thighs, and vent, white; the two middle feathers of the tail brown, and the others dusky, tipped with white; and its legs, red. Young birds reared by domestic pigeons soon become accustomed to the dove-cote, but as they are very susceptible of cold, they require to be protected from the chills of winter. In a wild state, they make a careless nest of dry sticks, and thereon deposit two eggs; when kept in the cote, small straw baskets should be furnished them to form their nests in. They will thrive upon bread, and any kind of grain and pulse, such as wheat, rye, peas, &c.

## THE COMMON PIGEON.

Common pigeons are generally blue or ash-coloured, with white backs and red legs; but by attention to the judicious crossing of breeds, their plumage may be enriched with tinges of copper, yellow, and other lively colours. They require very little care, and are so exceedingly prolific as to breed nine or ten times a year; and it has been calculated that the produce from a single pair would, in the space of four years, amount to the astonishing number of 14,762!

## THE FAN-TAIL, OR BROAD-TAILED SHAKER.



THIS beautiful variety of the pigeon tribe receives the name of **FAN-TAIL**, from its habit of spreading out the feathers of its tail like a turkey-cock; and that of **broad-tailed shaker**, from its breadth of tail, and a peculiar quivering motion of its neck. It has a full breast, and a short, handsomely-formed, arched neck, which it carries in a graceful, swan-like curve.

Its tail, according to the rules of the fancy, should consist, at the least, of twenty-four feathers,—and at the most, of thirty-six, which number it should not exceed; for, if the tail be overcrowded with feathers, the bird suffers it to droop—a defect never overlooked, although the specimen may be faultless in every other respect. Fan-tails, whose plumage is pure white, are more highly prized than those displaying red, yellow, blue, and black-pied colours; their carriage of the neck and tail being considered by far the most striking and elegant.

## THE NARROW-TAILED SHAKER.

SOME fanciers are of opinion that this bird is a breed between the broad-tailed shaker and another kind of pigeon, whilst others imagine it to be a distinct species. Its neck is shorter and thicker, back longer, and it has not so many tail-feathers as the broad-tailed shaker; neither does it expand its tail so fully, but keeps the feathers rather closed one over the other, so as to resemble a fan when some little way open. The colour of its plumage is generally white; but a few different tints, and even an almond variety, are to be met with occasionally.

## THE DUTCH CROPPER.

THIS species of pigeon is gravel-eyed, and thick, short and clumsy in the body and legs, which should be feathered down to the feet. These birds have a large crop or bag under their beak, which they can inflate with wind, or depress at pleasure; and they are such careless parents, and take so little heed of their young ones, that it is essentially requisite to put the little things, as soon as they have fed off their soft meat, under a pair of dragoons, pouters, or small runts. Care must be taken to supply the croppers regularly with food, else they will gorge themselves; a habit they are extremely addicted to unless properly tended.

## THE ENGLISH POUTER, OR POUTING HORSEMAN.



THIS fancy pigeon was originally bred in England, and thence derives its first name; and, from being a cross breed between a horseman and a cropper, its second title. Through judicious pairing with the cropper, it has attained great beauty and high value. Pouters are very expensive birds to rear, as the strain will soon become degenerate, and worth nothing; the fancier, will therefore, even if he commence with a stock of several pairs, be often compelled to sell or exchange

really good birds for inferior sorts, in order that he may be enabled to cross the breed. As the old birds pay little attention to the wants of their young ones, it frequently happens that the tiny creatures are starved to death; careful fanciers, therefore, never allow them to hatch their own eggs, but shift the eggs as soon as they are deposited, under a hen dragoon, that has lately laid; and and place the eggs of the latter bird under the pouter, in order that she may commence incubation, otherwise she will lay again in a short time, which, often repeated, would in all likelihood kill her. Every bird must be kept by itself during the winter season; and their coops must be lofty, so that they may not acquire a stooping habit, which is a very great fault. In the spring, every pair of pouters must have two pairs of dragoons to tend and feed them; but care must be taken that the dragoons are kept in a loft separate from the pouters, else a cross-breed may probably be produced, and the stock become degenerate. The rules laid down by the fanciers to regulate the various pro-

perties which a first-rate pouter should possess are the following : from the point of the beak to the tip of the tail, the bird should measure eighteen inches ; its shape should be fine, and its back hollow and tapering from the shoulders ; for if there be a rise in its back, it is termed hog-backed, and therefore considered defective ; it should carry the shoulders of its wings close to its body, and display the wings without straddling. Its legs from the toe nail to the upper joint of the thigh should be seven inches in length ; stout, straight, and well covered with white soft downy feathers, not marked with any other colour about the thighs or knee-joints, which is termed foul thighed ; nor spindle-legged. The crop ought to be large and circular toward the beak, and rise up behind the neck, so as to cover and run gradually off at each shoulder ; the bird should fill his crop with wind, to show its full extent with ease and boldness, yet not so much as to overcharge it, and cause himself to topple backward ; for many good birds, through this fault have tumbled down a chimney, or into the street, and so become tit-bits for the cats ; but if the bird do not fully inflate his crop, that is, only just enough to make himself look like an ill-made Runt, he is termed loose-winded. In point of colour, the blue, black, red, and yellow piers, are the most esteemed ; but if a blue pier and a black pier be equally fine in their properties, the black pier, on account of his plumage, is the more valuable of the two ; and if a yellow pier have the same markings as the two former, he will be more prized than either. The markings should be distributed over the bird, thus : the head, neck, back and tail, should be uniform in tint ; a blue pier pigeon should have two black streaks near the end of both wings, but if the stripes incline to a brown tint, the bird is termed kite-barred, and its value is thereby greatly deteriorated ; when the pinion of the wing is speckled with white, in the form of a rose, it is called a rose pinion, and is much prized ; and if the pinion be marked with a dash of white on the outer edge of the wings, the bird is reckoned bishoped or lawn-sleeved. If the nine flight feathers of the wings be not white, the bird is foul-flighted ; and if the outer wing-feather only be white, it is sword-flighted. The front of the crop should be white surrounded by a shining green, interspersed with the same colour with which the bird is pier ; but the white must not reach so far as to pass round the back of the head, for then it would be considered a ring-headed bird ; upon the crop there should be a crescent-shaped patch of the colour with which it is pier ; when that is missing, it is termed swallow-throated. Pouting horsemen are not so much in repute as formerly, the Almond tumblers having almost superseded them in the estimation of the fancy.

## THE PARISIAN POUTER.

THIS species was introduced, as its name implies, from Paris: it is short in body and legs, thick in girth, and has generally a long but not a very full crop. Its plumage is much admired, as every feather, the flight-feathers excepted, (which are white,) is elegantly streaked with a rich variety of colours; if much red be intermixed with the other colours, the more valuable is the bird considered. They are usually termed bull or gravel-eyed.

## THE UPLOPER.

THIS bird was originally brought from Holland: in appearance it greatly resembles an English pouter, except that it is somewhat smaller in all respects; it has thin legs, its toes are very short and close together, and it tips so exactly upon them when walking, as to leave the ball of the foot hollow; its crop is very round, and it generally hides its bill amongst the feathers upon it.

## THE HORSEMAN.



MANY fanciers suppose the Horseman to be a cross breed, either between a tumbler and a carrier, or a pouter and a carrier, and then again bred from a carrier. In shape it resembles the carrier, but it is smaller in all its properties; its body being less, its neck shorter, and the fungous-looking flesh round its eyes not exuberant, so that there is a greater space between the wattle on the beak, and that round the eye.

The most approved colours for this species of pigeon are the blue, and blue pied, as they are usually the best breeders. They should be flown twice a day regularly when young; and as they gain strength on the wing, they should be allowed to range loose, without any other birds in company. This variety of the pigeon tribe is the kind generally employed in carrying letters; the genuine carriers being much too scarce and valuable to be commonly used.

## THE TUMBLER.

THESE pretty pigeons are named from their peculiar habit of tumbling backward in the air when on the wing; besides which, they soar to so great a height as to be almost lost to the view; when flying, they congregate very closely together; and if they



be good birds, and accustomed to each other, they will maintain such a compact flight, that a dozen may almost be covered with a large handkerchief. If the weather be warm and bright, they may be allowed to wing their aerial gambols for four or five hours in succession; but care must be taken, that no other species of pigeon mix with them, for if they once become familiarised and fly with others, they will gradually drop their highly-prized mode of flight, and of course become worthless. They should never be let out on a dull, heavy, misty morning, nor when a fog appears to be rising, nor during a high wind; as all such atmospheric variations, by causing desertions from the aerie, tend to diminish the stock. A hen tumbler should never be allowed to fly while with egg. The most esteemed tumblers do not summer-set when swooping along, but only when they are beginning to rise, or when coming down to pitch; and, to preserve this and the high-flying properties in his stock, the provident fancier must spare no expense in the purchase of one or two first-rate birds that have been used to soaring, as they will be of much service in training the young ones. When the birds are accustomed to their houses, they may be turned out, upon the wing, but only once a day: a bright gray morning is the best time, especially for young birds; and some hemp or canary seeds must be scattered round their cotes, to entice them in, when their hours of liberty are expired.



There is a particularly fine variety of this species, which is called the Bald-pated tumbler, from its having a beautiful snowy white head: it has pearl eyes, and in plumage is exceedingly diversified; the tail and flight-feathers, however, match the head, which is pure white. When a tumbler, either of a black or blue colour, has a long dash of white from the under jaw and cheek to a little way down the throat, it is called a black or blue-bearded bird, as

the colour may be; and if this beard be well shaped, and the bird be clean in the tail and flight, as before described, it may be reckoned very handsome and valuable. When these varieties of pigeons are dashing along in the brilliant sunshine, the lively contrast of their feathers adds much to the vivacity of their appearance.

There is another and still more beautiful variety of the tumbler species, called by some fanciers the Ermine tumbler, but which is generally known by the name of the almond tumbler. It is

an extremely elegant, and highly-prized variety, and is derived from common tumblers judiciously matched; as yellows, duns, whites, black splashed, black frizzled, &c., so as to sort the feathers. When in perfection, tumblers are esteemed by many persons to be the prettiest of all the pigeon tribe; and this high opinion is borne out by the beautiful diversity of their colours, which are so elegant and rich in some birds, that they have been compared to a bed of tulips. The more they are variegated in the flight and tail, especially if the ground-colour be yellow, the more they are prized; and a fine bright-yellow ground has the precedence of all others, from its being so exceedingly difficult to acquire, that twenty light-coloured birds may be procured for one displaying a deep, richly-tinted ground.

## RUNTS.

Of Runts there are several species, the principal of which are the common, or dove-cote, the Roman, the Smyrna, the Friesland, the Leghorn, and the Spanish. The common species are usually good nurses, and are generally employed for rearing the more valuable kinds of pigeons. The Roman runts are so large and unwieldy, that they are scarcely able to fly; those of Smyrna, are middle-sized birds, with feathers sprouting from the outside of their feet, so as to present the appearance of small wings. The runt of Friesland is rather larger than the middle-sized common runt, and its appearance is very singular, from its feathers being all inverted, or turned the wrong way. The Leghorn species is a fine full-bodied, short-backed, broad-chested, close-feathered, pigeon; its head is shaped like that of a goose, it is hollow-eyed, and round the eye is a circle of thin skin; its beak is very short, with a small wattle over the nostrils, and the upper chap projects a little beyond the under; when walking, it raises its tail like a duck. The birds of this species are much more hardy than some fanciers imagine, and breed pretty well; but as they make very indifferent nurses, they should not be trusted to bring up their own young ones: their eggs must, therefore, be shifted under a dragoon, or some other tender nurse, taking care to give them a young bird of some other variety to attend to, in order to take off their soft food. Their plumage is usually of a grizzled colour, ermined round the neck; but the most valuable birds are the red, white, or black mottled. The Leghorn variety is of greater value than any other kind of runt, and by judicious crossing with the Spanish breed, a cross-breed may be obtained of very large size. Some persons much admire these birds, a taste in which we do not participate. Spanish runts are short, thick-legged, flabby-fleshed, loose-feathered birds, with very long bodies; their plumage is very various; the best, how-

over, are said to be those whose colour is either of a blood-red, or mottled tint.

#### THE FRILL-BACK

Is remarkable only for the peculiar curl of its feathers, which are so turned at the end as to make a little hollow in each of them; it resembles the runt in shape, but is smaller than that bird; its plumage is pure white.

#### THE CARRIER.

THE Carrier is somewhat larger than most of the common pigeons; its feathers lie very close and smooth, and its neck is long and straight. From the lower part of the head to the middle of the upper chap, there is a lump of white, naked, fungous-looking flesh, which is denominated the wattle; this, in good birds, is met by two small swellings of similar flesh, which rise on each side of the under chap; and if this flesh be of blackish colour, the bird is considered very valuable. The circle round the black pupil of the eye, is usually of a brick-dust red colour; but if it be of a brilliant red tint, it adds considerably to the value of the bird; this circle is surrounded by another of naked fungous flesh, generally about the breadth of a shilling, the greater the breadth of which, the more it is admired. When the incrustated



flesh round the eye is very thick and broad, it shows that the pigeon will prove a good breeder, and will rear fine young ones. The properties attributed to the carrier, and prized by the fanciers, are three in the head, three in the eye, three in the wattle, and three in the beak. The properties of the head consist in its being flat, long, and straight: for instance, if the head be very long, narrow and flat, it is reckoned, in shape, perfect; if the contrary, it is termed a barrel head. The prop-

erties of the wattle of the eye are its breadth and circular and uniform shape; for, if one part appear to be more scanty than another, it is termed pinch-eyed, and is of comparatively little value; while, if it be full, even, and free from irregularities, it forms a rose-eye, and is highly prized. The wattle should be wide across the beak, short from the head to the point of the beak, and lean a little forward from the head; as the bird is said to be peg-wattled if it lie flat. The beak must be black, long, straight, and thick; if it be an inch and a half in length, it is

considered a long beak, but it must never measure less than an inch and a quarter; if the beak be crooked, (or hook-beaked,) or spindle-beaked, the value of the bird is much diminished. This species is in general either dun or black in colour, although white, blue, splashed, and pied specimens occur; the black and dun birds are usually the most perfect in their properties; but as the blues, whites, and piers are very rare, inferior birds of these colours are of considerable value. The Carrier has been termed king of the pigeons, from its great sagacity, and elegance of shape.

#### THE MAWMET.

THE Mahomet, commonly corrupted to Mawmet, is a beautiful cream-coloured bird, with bars of black across its wings; although the surface of its feathers is of a cream colour, the part next the body, the flue feathers, and even the skin, are of a dark sooty tint: it is about the size of a Turbit, but it has in place of a frill, a fine gullet, with a seam of beautiful feathers; its head is thick and short, and its eyes orange-coloured surrounded by a small naked circle of black flesh; it has a little black wattle on its beak, which is short and stout, and somewhat resembles that of a bulfinch.

#### THE BARB.

THIS species was originally introduced from Barbary: in size it is somewhat larger than the Jacobin; it has a short thick beak, a small wattle, and a circle of thick, naked, incrustated flesh round its eyes; the wider this circle of flesh spreads round the eye, and the more brilliant its colour, the more the bird is prized; the circle is narrow at first, and is not fully developed until the bird is three or four years old.



The plumage of the Barb is usually dun or black; but there are pied birds of both colours; these last are held in little estimation, as they are supposed to be only half bred; when the pinion feathers are dark, the irides of its eyes are pearl coloured; but when the pinions are white, the irides are red. Some of this species are orna-

mented with a tuft of feathers rising from the back part of the crown of the head. The illustration is taken from life.

## THE SPOT

Is so called from a spot of colour just above the beak. Its body is mostly white; the tail feathers generally correspond in colour with the spot, which is either red, yellow, or black, and sometimes, but not very frequently, blue. Spots invariably breed their young ones of their own colour.

## THE DRAGOON.



DRAGOONS are a breed between a Tumbler and a Horseman; and by frequently crossing them with the Horseman, they acquire much strength and swiftness. They are exceedingly good breeders and kind nurses, and are, therefore, often kept as feeders for rearing young Leghorn Runts, Pouters, &c. The Dragoon is somewhat lighter and smaller than the Horseman; and one of its chief beauties consists in the straightness of the top of its skull, with that of its beak, which,

according to the rules of the fancy, should almost form a horizontal line. These birds should be flown and trained while young, in the same way as the Horsemen, which they are considered to surpass in swiftness, in short flights of from ten to twenty miles; but in longer distances, if the Horsemen be well bred, they will far outstrip the Dragoons.

## THE JACOBIN.



THIS pigeon, often called a Jack, is, when perfect in its properties, extremely rare. The real Jacobin is a very small bird, and the smaller it is the more valuable; it has, on the hinder part of its head, inclining towards the neck, a range of inverted feathers, in appearance like the cowl or cap of a monk; and from this peculiarity it receives the sobriquet of Jacobin, or Capper. These feathers are techni-

cally termed the "hood," and if they grow compact and close to the head, they enhance the value of the bird considerably; the

lower part of the hood is called the "chain," and the feathers composing it should be long and thick.

A small head, very small spindle-shaped beak, and beautifully clean pearl eyes, are other properties of this little pet. Yellow, red, blue, and black, are the colours usually bred, and in point of colour, the yellow birds are preferred before all others; however, let the colour of the body be what it may, according to the rules of the fancy, the tail, flight, and head must invariably be white: sometimes the legs and feet are covered with feathers. The illustration prefixed is taken from a very fine living specimen.

#### THE CAPUCHIN,

In its properties, is closely allied to the Jacobin, and is, by some fanciers, considered a mixed breed between a Jacobin and some other kind. It has a longer beak, and is altogether a larger bird, than the Jacobin; its hood is extremely pretty, but it lacks the chain.

#### THE TRUMPETER.

This variety of the pigeon tribe is almost as large as the Runt, and resembles it in form. The head has a round crown, which is much prized for its size; from the root of the beak rises a tuft of feathers, according to the size of which is the value of the bird; and its legs and feet are covered with feathers. These birds derive their name from making a noise like the sound of a trumpet, in the spring-time of the year; and at other times, if they be fed plentifully with hemp-seed, they will utter this trumpet call. They are mostly pearl-eyed, and have black mottled plumage. The Trumpeter is not an especial favourite amongst true fanciers, and is usually considered a toy pigeon.

#### THE TURBIT



Is of somewhat larger size than a Jacobin: its head is round, and beak short; from the breast grows a tuft of feathers named the purle, spreading in opposite directions, like the frill of a shirt; and from the beak to the purle reaches the gullet. The colours of this pigeon are mostly yellow, dun, red, blue, and black; and occasionally chequered. According to the fancy, the back of the

wings and tail should correspond in colour, except in the yellow and red birds, whose tails should be white: a stripe of black should cross the wings of the blue birds, but the other body and flight feathers should be white; they are termed black-shouldered, or blue-shouldered, as their colour may be; and when of one colour only, these pigeons have been sold as owls. Turbits are also chosen for the shortness of their beak, and their spreading purle; and if well-trained when young, they will become excellent flyer.

#### THE RUFF.

Has sometimes been passed off as a Jacobin, but it is a distinct variety; as it has a larger head, longer beak, and is altogether of larger size. The chain and feathers do not reach so near the wing shoulders, neither do they nor the hood grow so closely, as in the Jacobin, although the feathers of which they are composed are longer.

#### THE OWL.

THE Owl is somewhat smaller than a Jacobin: it is gravel-eyed, and has a short curved beak, very much like that of an Owl, whence it is named. The purle is rather larger, and expanded in a rounder form, than in the Turbit; but in other respects the birds closely resemble each other. Their breeding-places should be secluded from observation, and dark; for they are easily frightened, and when molested, fly from their eggs.

#### THE NUN.

THE Nun is greatly admired, from the elegantly contrasting colours of its plumage. Its body is generally white, and its tail and six flight feathers of its wings should be either wholly red, vivid yellow, or black, as likewise its head, which is adorned and nearly covered by a tuft or "veil" of pure white feathers; according to its colours, the bird is termed a red, yellow, or black headed Nun, as it may happen to be; and whenever the feathers vary from this rule, the bird is termed foul-headed, or foul-flighted, and is greatly diminished in value; but such birds as frequently rear clean-feathered birds as the perfect specimens; and it is scarcely possible to obtain a bird entirely free from foul feathers. Smallness of head and beak, a pearl eye, and largeness of veil, are handsome properties in this bird.

## THE HELMET

Is a somewhat larger bird than the Nun: its head, tail, and flight, are mostly of one colour, either yellow, blue, or black tint, and the other parts of the body are generally white; its head bears a delicate tuft of feathers, differing in colour from the body, and in form like a helmet. It is a pretty bird, but is not a fine flyer; and is most useful as a nurse.

## THE LACE

Is a rare bird: in form and size it resembles a common Runt; its colour is uniformly white; and the plumage webs or fibres being apparently unconnected with each other, make the bird look singular, yet very pretty.

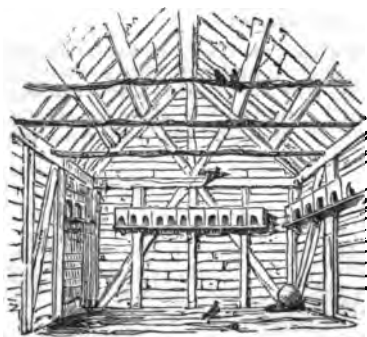
## THE PIGEON-HOUSE.



It is scarcely possible for a London boy to possess a good flight of pigeons, from the want of outbuildings and other conveniences which might be made into roomy dove-cotes, or pigeon-houses. Bird-fanciers breed fancy pigeons in the lofts between the ceilings of the garrets and the tiled roofs of their houses, and through an opening in the tiling, fix their traps or aeries on a platform outside; but this roof-climbing is dangerous; and we recommend lads to be content with two or three, or at any rate a few, choice birds, and a capa-

cious cote. The most common shape is the one represented in the annexed illustration, but the form is immaterial. It is, however, necessary that the holes should be large enough for the birds to turn round in with ease; and there should be in front shelves and partitions of from seven to nine inches in depth, so as to keep the couples apart, and afford them resting-places; and two holes for each couple, between each partition, will be desirable. The cote should be fixed where it will be screened from cold winds, which are extremely prejudicial to the birds: a southern or western aspect should, therefore, if possible, be chosen; visits from cats and rats must also be carefully guarded against.



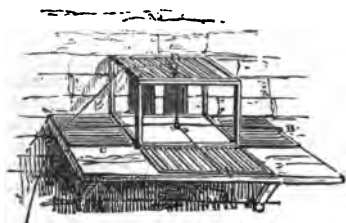


If the young fancier be enabled to fit up a loft over a stable, or other out-building, for a pigeon-house, the best arrangement he can adopt is that shown in the accompanying illustration. The means for exit and re-entrance must be first thought of; and if there be no window in the loft, two holes must be made in the wall, at about five feet from the floor,

each sufficiently large to admit a pigeon easily; a shelf should be fastened on the inside, and another on the outside, of the said apertures; on this latter shelf, a trap or aërie should be affixed, the intents and purposes of which we shall presently explain. At the upper part of the loft, rough branches should be placed as perches, at the height shown in the representation. At about four feet from the floor, breeding-boxes, according to the number of birds intended to be kept, should be securely fixed to the wall, care being taken to protect the birds from rats, &c. Old egg-chests may be turned into very good breeding-boxes, but they must be partitioned off inside, so as to form separate places for the birds to nestle in. Some fanciers furnish their boxes with little earthenware pans, or small baskets, for the birds to deposit their eggs in; although the eggs are not so likely to be broken in the baskets as in the pans, the latter, if supplied with straw or frail, are cleaner than the baskets; the pans should vary in dimensions, according to the species of pigeon for which they are purposed. It is as well to put two of these receptacles in each little room, as the hens frequently go to the nest again when their broods are about three weeks old, leaving them to the care of their mates. Instead of egg-boxes, shelves partitioned off, and having sliding fronts for the convenience of cleaning, are used; if the young fancier intend to keep Pouters, the shelves should be fourteen inches in breadth, and at least twenty inches apart, so that the birds may not acquire the habit of stooping, which depreciates their value. The fountain, a large-bellied glass bottle, with a tolerably long neck, for water, should be provided for the pigeon-house; it should be placed on a small three-legged stool, so that its mouth may incline into an earthenware pan,

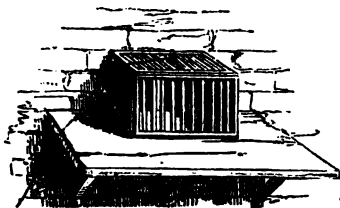
into which the water will trickle slowly, and cease when it reaches the level of the mouth of the bottle, and a continued supply of fresh water thus be kept up; two or three bricks will serve instead of a stool, to give the bottle the necessary elevation.

To insure the thriving of the birds, the loft and shelves should be kept clean, and gravel strown on the floor; indeed, gravel must on no account be omitted, as pigeons are exceedingly fond of picking it.

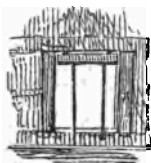


on the platform, as in the annexed figure A B C; and on the upper parts of these flaps are fastened strings, united to a single string in the middle of the trap; the string is carried over the swivel E, at the top of the machine, to a hiding-place, whence the owner can see all that passes, and when a bird alights within the aérie, he jerks the string, the flaps are elevated, and the bird

is immediately a prisoner; the aérie, when shut, presents the appearance shown in the marginal illustration. This kind of trap is used not only by fanciers, but by amateurs; and is an important appendage to the loft, both as a means of self-defence to secure strays, and to shut in



their own birds; among amateur fanciers, the first-mentioned purpose is to secure valuable and favourite breeds from being deteriorated through stray birds of no value pairing with them. When any strays are taken in the trap, they are killed for the table, unless called for and claimed by their owners, within twenty-four hours after their capture, and a trifling sum may then be demanded for trappage.



A bolting wire is recommended by some persons to be added both to the loft and the aërie : its chief use is to enable birds to get into the loft after the folding-doors of the aërie are shut ; and if it also be fitted to one of the doors of the aërie, it will prove useful. An aperture sufficiently large to admit a pigeon must be made, and a slip of wood, nearly as long as the width of the opening, hung to the upper part of it by two small wire hinges, as shown in the accompanying illustration ; this slip must move very freely, and into it two pieces of wire should be driven, the length of which must be regulated by the depth of the opening, taking care that they reach a little below the lower edge of it. This bolting-wire should of course open inwardly, in order that any birds which have straggled from the flight, and been slow in returning home, may, when they wish to rejoin their companions, push it inward and enter the loft ; and when once in, be prevented from getting out again until the aërie is open.

The call, by which pigeons are enticed into their trap or house after they have been indulged with a flight, is a very shrill, loud, and prolonged whistle ; and if some favourite food be given to them, after they have attended to the call, they will by degrees become so well trained to it, as to respond to the signal whenever it is made. They should be trained to come at this call invariably before they are fed ; and they may be summoned together by it when in the loft.

#### FEEDING.

PIGEONS are fond of almost every kind of grain, but old tares are found, by experience, to be the best for them ; horse-beans, particularly the smaller sorts, as small ticks, are considered next to tares in point of nutritive properties ; oats, barley, wheat, and peas, may be given occasionally, and will be found wholesome varieties of diet. Pigeons are very fond of rape, hemp, and canary seeds, which, however, should only be given occasionally ; and new tares should, especially to young birds, be given very sparingly.

The seed may be scattered on the floor amongst the gravel, although many persons recommend little contrivances to put it in, on the score of keeping it cleaner and better ; yet, in our opinion, and we are not single therein, such evidences of the constructive skill of the fancier speak more of his own ability than the comfort of his birds.

## MATING.

For mating or coupling pigeons, it is a good plan to build two cotes, divided only by a lath partition, by which means the birds will see each other, and may feed out of the same little vessels; when, by giving them plenty of hemp-seed, they will soon be fit for mating. When the hen sweeps her tail, put her in the cock's pen, and they will readily agree. Where it is not convenient to make this probationary pen, and you are obliged to place them both in one coop, put the cock in a few days before his mate, that he may get accustomed to it, and feel himself master, especially if the hen be high-spirited; else they will quarrel so fiercely, that their disputes will terminate in a total dislike of each other. When the pigeons are comfortably matched, allow them the full run of the loft, to select a nest for themselves; or choose a nest for them, and inclose them in it for several days, by means of a slight lath railing, giving them an abundant supply of food and water, during the whole time.

## DISEASES.

The **MEGRIMS** is an incurable disorder, in which the pigeon moves about and flutters at random, with its head turned, and its bill resting upon its back.

If the birds suffer much while **MOULTING**, remove them to a warm place, mix a good quantity of hemp-seed in their ordinary food; and tinge their water with saffron.

When the birds are affected with the **WET ROUP**, give them a few pepper-corns once in three or four days, and put some green rue in their water.

The **DRY ROUP** is a husky cough, arising from a cold; when three or four cloves of garlic should be given to the birds daily.

When your pigeons are infested with **INSECTS**, fumigate their feathers thoroughly with tobacco.

The **CANKER** is occasioned by the cocks pecking each other, which, as they are extremely irritable, they often do: to cure it, rub the part daily with a mixture of burnt alum and honey.

If the incrustated flesh round the eyes of Carriers, Barbs, or Horsemen, be injured or pecked, bathe it with salt water; and if, in some days, this remedy does not succeed, another lotion composed of three drachms and a half of alum, dissolved in two ounces of water, should be tried.

When Pouters and Croppers gorge themselves, by over-eating, after long fasting, put the bird, feet downward, into a tight stocking, smoothing up the crop, so that overloaded as it is, it may be kept from hanging down; then hitch up the stocking on a nail, and keep the bird a prisoner until its food is digested, sup-

plying it with a small quantity of water occasionally. When the bird is taken out of the stocking, it should be put into an open coop or basket, and should be fed but scantily for a while.

For lameness, or swelled balls of the feet, whether from cold, cuts with glass, or any accident, the most effectual application is a small quantity of Venice turpentine spread on a piece of brown paper.

#### LAWS RELATING TO PIGEONS.

By act of Parliament of 7 and 8 Geo. IV. c. 27, it is enacted, that if any person shall unlawfully and wilfully kill, wound, or take any house-dove or pigeon, under circumstances not amounting to larceny, upon being convicted thereof before a justice, he shall forfeit over and above the value of the bird any sum not exceeding forty shillings. But it has, nevertheless, been determined that the owner of land may kill such pigeons as he may find devastating his corn.

#### CONCLUSION.

As many pigeon-dealers play off innumerable tricks upon youthful, inexperienced fanciers, it is highly necessary to have the advice of some person well acquainted with pigeons, when making a purchase, especially if a select stock be required.

Before you allow your pigeons to leave the loft, satisfy yourself as to the honesty of such of your neighbours as keep pigeons. for, if any of them be adepts in enticing birds into their own aeries, your stock will soon be reduced in number.



## SONG BIRDS.



All down in the grove,  
Around, above,  
Sweet music floats;  
As now loudly vying,  
Now softly sighing,  
The Nightingale's plying  
Her tuneful notes.  
And joyous at spring,  
Her companions sing.

GODFREY OF NIFEN.

LAYS OF THE MINNESINGERS.

Spring woke, and in her beautiful blue sky  
Wandered the lark,—the merry birds beneath,  
Poured their sweet woodland poetry.

J. T. CARRINGTON.

THE love of the songs of birds is universal: it is a passion confined neither to the buoyant years of youth, nor the sobriety of age, but it is shared equally by each; neither is it restricted to the learned, nor the wise, nor the rich in this world's goods, but the humble and the poor also partake largely of it. The songs of love and gladness which birds pour forth in the bright balmy sunshine, or in their native woods, fall with talismanic power upon the ears of the lovers of nature; the cheerful trills of the little captives when caged in their wired prisons in some dingy

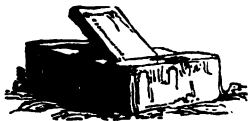
(243)

apartment in a city, are the source of unmingled pleasure to the plodding money-getting citizen; and the poor weaver feels pleasure, as he plies the busy loom, in teaching bulfinches to warble national airs, and in training goldfinches to perform many engaging little tricks; the humble peasant finds amusement in his starling, which in its wicker cage, upon "the woodbine arbour hangs;" and often may a country cobbler be seen sitting near the window of his snug roadside cottage, progressing cheerily in his work, and ever and anon pausing to listen with rapture and pride of heart to his blackbird, piping some gay ditty or plaintive love song which he has himself taught it.

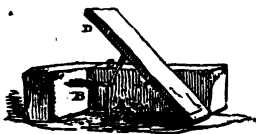


BIRD-CATCHING.

Boys residing in London, or any large town, may always procure good, healthy birds, of strong musical powers, by applying to respectable bird-fanciers; whilst those who live in the country must use contrivances to ensnare them; and there are, perhaps, few occupations which afford to country lads such an inexhaustible fund of amusement as bird-catching. In the bright, budding days of Spring, in the sunny hours of Summer, in the sombre and declining Autumn, and in the chill, piercing days of Winter, lads may set their cunningly-contrived nets, and exert their skill in the construction of traps; nor be wholly shut out from pursuing their sport, when night unfolds her dark mantle, and dims all objects by her veil of gloom.



The BRICK TRAP, employed by the veriest tyros in bird-catching, is formed of four bricks and a tile: two of the bricks are placed lengthwise, parallel with each other, and the others are set one at each end; the tile acts as a cover, and to support



port seems, the whole weight of the tile, D, bears upon it. At the bottom and around the trap, some seed should be scattered, and the apparatus is then complete. The instant a bird, attracted by the seed, alights on the forked twig, it jerks up, and of course displaces the slender prop of the tile, which instantly falls and incloses the little adventurer.



The SIEVE-TRAP, OR DEAD-FALL, is thus contrived : in the winter, when the ground is mantled with snow, clear a space about the size of a sieve ; scatter about the spot some ashes, and sprinkle upon them a few bread-crumbs, or red berries. The sieve should then be propped up, over the cleared space, by a bit of stick, as in the illustration ; to the middle of the prop, a piece of fine twine, of sufficient length to reach to a window or hiding-place, must then be fastened ; at the place of concealment, the contriver next takes his station to watch all the comers to his trap, and the instant he sees any birds settle beneath it, if he jerk the string, the sieve will fall, and those which may be unfortunate enough to be under, will be immediately encaged. The trappist must then draw a cloth or apron cautiously under the sieve, and, taking care that he does not elevate the sieve so as to allow the birds to escape, raise the ends of the cloth to the centre, and carry his prizes into the house.

HORSE-HAIR NOOSES, employed in the winter for catching larks, are thus made and set :—when the ground is overspread with

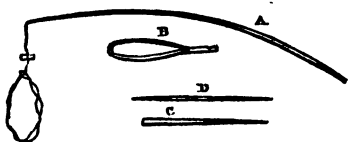


snow, take about a hundred yards of packthread, and at every six inches, fasten a noose composed of two horse-hairs twisted together. When you set them, thrust little pegs into the earth, every



twenty yards, and fasten the packthread to them, so as to keep the nooses at about the height of a lark when running. Scatter a quantity of white oats on the snow, from one end of the line to the other; and when the birds hasten to partake of the food, they will speedily get entangled in the nooses, from which, of course, they must be immediately taken out.

The SPRINGLE is one of the most efficient traps in use, and is constructed in the following manner: get a hazel switch of four feet in length, to the taper end of it tie a piece of string, of about fifteen inches in length, and near the end of this string, fasten a catch or little piece of wood, of half an inch in length, a quarter of an inch in breadth, and the eighth of an inch in thickness; and this piece of wood must be slightly bevelled off at one end, so as to adapt it to a notch in the "spreader." A very loose slip-knot must next be fastened to the end of the string, below



the catch, and then the spring part of the machine will be complete, as at A, in the illustration. The "spreader" is the next thing to be made, and for it a little switch of about eighteen inches in

length is requisite; the small end of it must be bent back, and fastened to within an inch or thereabout of the thicker end, so as to form a loop as in B; and at the latter end a notch must be cut for the purpose of receiving the catch before mentioned. A "stump," C, and a "bender," or pliant bit of switch, D, each about eighteen inches in length, complete the springle. The method of setting it is the following: drive the stump, C, into the ground, put the loop of the spreader over it, as B, and at about the length of the spreader from the stump, thrust the ends of the bender firmly into the ground, as D; then put the thick end of the springer into the ground at a little distance from the bender, as at A and bend it down until you can place one end of the catch upward, on the outside of the bender; then raise the spreader about an inch from the ground, and put the smaller end of the catch in the notch, by which arrangement the spreader will be held in its proper position, and the springer prevented from jerking up without some cause. Arrange the horse-hair slip-knot loosely round the spreader and stump; scatter some seed inside it, also sparingly outside, and for a little space around, to attract the birds to the more plentiful supply within the spreader; and the springle will then be completely prepared, as shown in the

illustration. Its action is very simple, and is as follows: when a



bird, attracted by the seed, perches upon the spreader, it falls with its weight, the catch is instantly freed, and in consequence, the

springer flies up, ensnaring the poor bird in the slip-knot, either by the legs, neck, wings, or body. If the trapper wish to take the birds alive, he must keep watch within sight of the trap, so that as soon as one is imprisoned, he may run and take it out, else the victim will either be strangled, or beat itself to pieces in vain endeavours to escape.

The NIGHTINGALE TRAP, is of an oblong shape, about four inches in depth, with a perch or stick to support the top, which is so placed as to fall and secure the bird the instant he hops in to get at the bait.

The TRAMMEL NET is generally made about thirty-six yards in length, and six in breadth, with six ribs of packthread: the ends of which are fastened upon two poles each of sixteen feet long. The mode of using this net is, for two persons to take it out on a dark night and drag it on the ground, touching it with the net at intervals of five or six steps, otherwise many birds would be passed over. The instant any birds fly up against the net, it is dropped, thereby securing all that are underneath. Many other birds which nestle on the ground, besides larks, are, as may be supposed, taken in this species of net.

BIRD-LIME is often recommended for taking birds, but it is very ineffectual. There are two ways of using it: the first is by smearing some small twigs with it, laying them on the ground and scattering some crumbs of bread around them; the moment the birds observe the treat laid out for them and alight, they get entangled with the twigs which adhere to their feet, and form a great hindrance to them in flying away, even if they do not check their flight altogether. The other method of employing the lime is by smearing some over a hog's bristle, to the end of which a piece of bread has been secured; this is thrown upon the ground; a bird, little dreaming mischief, flies away with the piece of bread, and the bristle soon gets entwined around its wings, and brings it to the ground; this method is, perhaps, less effectual than the former, as the bird may fly some distance before it falls.

In taking young birds from the nest, great care is necessary for if carried away when only stubbed or half naked, it is impossible to rear them by hand, as they require such constant feeding and attendance. The proper time for removing them is when the tail-feathers begin to grow, for should they be removed at an earlier period, their stomachs will not support the change of food ; and if at a later, in most cases it is difficult to make them open their beaks to take in a kind of food so novel to them. Some species of birds, however, are naturally so docile, that they may be taken at any age, and reared with facility.

#### THE LINNET.



THE common Linnet, being the most plentiful and easily procured of all our songsters, and therefore the cheapest, is well adapted for young fanciers to commence stocking their little aviaries with. During the summer, Linnets frequent hedges, bushes, and furze, and the skirts of woods ; as soon as autumn sets in, they take to the fields, and congregate in large flights ;

and in the winter they are wanderers, roving about in quest of food wherever the snow has not enshrouded the earth in its white robe. These birds have usually two broods in the year, and the young ones are sufficiently fledged in April to be taken. The male birds may be distinguished from the females by being browner on the back ; by having the first, second, third, and fourth feathers of the wings white up to the quill ; and in the spring, by being crimson on the breast : the females are usually grayish on the back, streaked with dusky brown, and yellowish white, on the rump with grayish brown and reddish white, and on the breast these spots are tolerably plentiful ; the wing coverts are dusky chestnut. When younglings in the nest, the males have a white collar, and some white tints about the tail and wings ; and the females are generally more of a gray than a brown colour, and very much streaked on the breast. These birds are usually taken in clap-nets : when secured, they should be put into store cages, and supplied with such seeds as you find they feed on, with the addition of a little bruised hemp-seed ; the cage should be placed where the birds may not be molested for three or four days, after which time they should be taken out and put into separate cages, which are usually of very small dimensions and trifling cost. These little habitations are wired at the front



and two sides, and the top and back are made of wood, painted on the outside green, and in the inside white; the receptacles for water and seed are commonly made of lead, but in superior cages, a drawer for the seed, and a glass for the water, are provided. The most proper food for these birds is the canary and summer rape-seeds, (winter rape-seed is poisonous to them when in captivity, although not at all hurtful when they are wild,) and a little hemp-seed occasionally; seeded chick-weed, beet-leaf, and lettuce-seed will be found beneficial if the birds be moping; and if they have on them a looseness, a bit of chalk and some bruised hemp-seed, a stalk of plantain, and saffron in their water, are excellent remedies. The Linnet's song is highly esteemed, its rich and brilliant strains following each other in a very delightful style. If taken from the nest, the Linnet may be taught to imitate the songs of the Canary, Woodlark, Chaffinch, &c.; and if kept by itself, to repeat tunes whistled to it. When Linnets are taken young, the food most recommended is moistened white bread, hard-boiled egg, and soaked hemp-seed. Male Linnets will pair with hen canaries, and their mule progeny can scarcely be recognised from gray Canaries; their song is exceedingly beautiful, and they will learn tunes readily. A Linnet will in general live from ten to twelve years in the house.

#### THE LESSER REDPOLE.



THIS beautiful little bird, although not a warbler, is an especial favourite amongst boys from its extreme docility, and aptness in learning. The upper part of its body is a dark brown, and the feathers are tipped with a paler tint of the same colour; the feathers of its neck and breast are rose-coloured, edged with white; the rump is rose-coloured also, and the rest of the under part of the body white; the greater and lesser wing coverts are bordered with dirty white, making two light bars across the wings; the forehead is of a most brilliant crimson, bill light brown colour, dusky at the point; legs dusky. The female is not so strongly coloured as the male, neither has she any rose tint on her breast; the upper part of her body is speckled with brown and white, and indeed her breast is slightly spotted with the same hues. These docile birds may

be taught to draw up a little bucket of water, to come and go at command, to hop along a species of ladder, composed of small wooden pegs driven into a wall, about six inches apart, and so arranged as to form a gradual ascent and descent, as shown in the



annexed figure; they will also hop from one thumb to another, held at some distance asunder. Before commencing their tuition, they must be deprived of

the power of flying away, either by clipping the feathers of one wing, or by pulling out some of the flight feathers altogether; the latter method, though perhaps more cruel, is frequently preferred, as the wing is more quickly restored to its natural condition; the feathers being renewed in about six weeks; while, by the other plan, they are not restored until the next moulting time. By the time the wing is properly grown, the birds generally become so tame as to render a repetition of the operation unnecessary; indeed, so thoroughly domesticated will they become, that they may be allowed almost perfect liberty; they may even be taken out to the distance of half a mile, or a mile from home, and they will return, although sometimes after a week's absence. The food proper for them, is canary, rape and flax seed, mixed; sometimes, also, a few grains of hemp, as a treat, with maw-seed, or a little saffron in the water, as medicine.

#### THE CHAFFINCH.

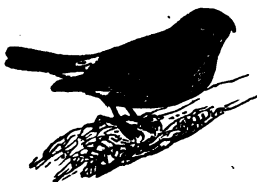


THE song of the Chaffinch being very little admired by English fanciers, the bird is seldom kept caged. Chaffinches breed in hedge-rows, and the young ones are hatched early in May; they may be taken when about twelve or fourteen days old, and should then be fed upon the crumb of white bread and rape-seed soaked in water. The

males may be distinguished from the females, even at that early age, from the breast being more tinged with red, the wings blacker, and the lines crossing them whiter, and from the circle round the eyes being of a deeper yellow colour; if you are uncertain respecting the sex, pluck out some of the breast feathers, they will be renewed in a fortnight, and if the red tint be visible, you may be certain that it is a male bird; if otherwise, a female. The plumage of a full-grown male Chaffinch is extremely beautiful:

its forehead is black, beak blue in the spring, but after moulting and during the winter, white; the crown of the head, and the hinder part and sides of the neck, bluish ash-colour; the sides of the head, the throat, fore parts of the neck, and the breast, are of a vinous red; belly, thighs, and vent white, lightly tinged with red; the back is reddish-brown, changing to green on the rump; the greater and lesser coverts of the wings are tipped with white, the bastard wing and quill feathers are black, edged with yellow; tail, black, the outermost feather edged with white, and legs dusky colour. The female differs considerably from the male, her head, neck, and upper part of her back, being grayish brown; the under parts of her body are dusky white, slightly tinged with reddish gray on the breast. Chaffinches frequent copses, orchards, and forests, and old birds and branchers may be taken with clap-nets in June or July. They thrive best on rape-seed, to which a little of hemp-seed may be sometimes added to incite them to sing; they also like chick-weed, and other green food. In Germany, Chaffinches are so highly valued, that very high prices are paid for them, if they possess a fine song; a common workman will give sixteen shillings for a bird whose notes he considers good, and will cheerfully live upon bread and water, until he can save money to purchase the desired object.

#### THE BULFINCH.



THOUGH the natural tone of the Bulfinch is far more agreeable, yet as it possesses considerable powers of mimicry, it learns to whistle airs with great correctness, and touches them off in so pleasing a manner, and with so soft a note, that it is one of the most highly-prized of cage-birds. It may even be taught to repeat

a few syllables distinctly. In Hesse and Fulda, in Germany, vast numbers of these little mocking-birds are taught to whistle such airs as God save the Queen, the Hunters' chorus in *Der Frieschutz*, &c.; they are principally brought over to England, where very high prices are frequently paid for them, especially if they be thoroughly accomplished.

In England, Bulfinches are not very numerous, through a species of petty war having been carried on against them, from their destructiveness to wall fruit. They build, twice in a year, unartificial nests in quickset hedges, or in retired parts of woods; the young are hatched in about a fortnight, and if you wish to rear the birds from the nest, take them when the tail feathers

begin to make their appearance; and you may easily detect the young males from the females, by their reddish breast. They thrive best on rape-seed, soaked in water, and mixed with white bread. When they can feed themselves, you may commence your course of tuition, by whistling the airs you wish them to imitate; and you must not be discouraged by the length of time which may elapse before they can repeat the tune correctly. Soaked rape-seed, with the addition of a little hemp-seed now and then, by way of a treat, and some green food, such as chick-weed, water-cress, lettuce, &c., is the best food for these birds; sweets and other delicacies, which some persons recommend, are highly injurious and should on no account be administered freely. When moulting, a little saffron in their water, and a plentiful supply of green food, will be found beneficial. If these birds be fed entirely on hemp-seed, they lose their variegated plumage, and become wholly black; indeed, the same alterations of colour, produced by feeding much upon that seed, have been observed on other small birds, such as the Field-lark, Wood-lark, &c. As these birds are not particularly restless, a middle-sized cage will serve.

Bulfinches are taught to *pipe* by a bird-organ, when they are very young from the nest. This method of instruction is not, however, recommended, as bird-organs are rarely accurate, and their notes are harsh and discordant; for bulfinches repeat the sounds exactly as they hear them, whether harsh or false, according to the instrument used. The good and pure whistling of a person of taste is far preferable; the bird repeats it in a soft, flute-like tone. When one cannot whistle well, it is better to use a flageolet.

#### THE GOLDFINCH.



THE Goldfinch, in richness of plumage, surpasses all other singing birds; and in docility and ability, it is inferior to none. Its forehead and chin are of a beautiful scarlet colour; its bill is white, tipped with black, and a black line passes from each corner of the bill to the eyes, which are dark; the top of its head is black; and the same colour extends

downward from the nape on each side, so as to divide its cheeks, which are white, from a spot of white on the back of the neck; its back and rump are of a cinnamon brown tint; sides the same, but rather paler; belly white; greater wing-coverts, black; quills, black, barred in the middle with yellow, and tipped with

white; tails feathers, black, with a white spot on each near the end, and legs of a pale flesh colour. Its song is highly agreeable, although not so varied in its strains as that of many other songsters; neither is it so expert in learning tunes or the songs of other birds as the Canary or Linnet; but it will learn to come and go at command, and to perform a variety of tricks, such as firing a cannon, counterfeiting death, letting off a cracker, or pulling up a bucket of water. In a wild state, Goldfinches frequent brambles and thickets; and woody mountainous districts, which are interspersed with fields; they are also partial to thistle fields, where they congregate in large flocks; they are generally taken in clap-nets. In the summer they are tender, and rather difficult to rear; but in winter they will soon sing after their capture. When taken young, they should be fed upon bread and milk, with a little ground canary-seed, for five or six weeks; then give a little canary-seed in addition, and the sooner you can bring them to the canary-seed alone, the better. When full grown, they may be fed upon poppy and canary seeds, with lettuce and rape-seed occasionally by way of change; green food, such as chickweed, water-cresses, lettuce and endive, should also be given sometimes. If your bird be troubled with a looseness, a little bit of chalk should be put in the cage, and red sand strewed over the bottom of the cage. A square cage is the best-shaped one for this bird, as it is not fond of hopping about the upper part. Goldfinches will pair with Canaries, and produce fruitful mules; it is better to pair a male Goldfinch with a female Canary, than the reverse; in plumage, the mule birds are very pretty, blending the richness of colour of the Goldfinch, with the yellow of the Canary, and in point of song they are exquisite.

#### THE CANARY.



THIS delightful little warbler is not a native of Europe, having been originally brought from the Canary Islands; it has, however, become, in some measure, acclimated in England, and is probably more esteemed by all classes of people than any other species of song bird. In a wild state, its colours vary exceedingly, some being gray, others white, vivid green, some chestnut, some yellow, and others blackish; and it is from an intermixture of these colours, that the varieties now in fashion, take their origin. The yellow or white bodied birds are the most esteemed, if the wings, tail, and head, (especially if



crested,) be yellowish dun; the next valued are those of a beautiful rich yellow, with the head, wings, and tail grayish; gray birds with a yellow head and collar, and yellow with a greenish tuft, are also much admired.

It is difficult to distinguish the male bird from the female; but as a general rule it may be observed, that he is rather larger and longer in the body, more elegant in his form, and higher in his shanks than the female; he is also longer from the legs to the vent, and particularly taper in that part; and if you blow the feathers up, his vent appears larger, and the orifice smaller, than in the female. Another test for distinguishing the sexes is their colour; the male being brighter than the female, especially round his eye, where the colour is a deeper yellow than any other part of his body. Those birds which introduce amongst their own notes some strains of the Nightingale and Woodlark's songs, are the most esteemed; and it is highly necessary when purchasing a bird to hear it sing before you complete the bargain, as many females, particularly old ones, by uttering a few unconnected notes, have been mistaken by unskilled persons for males. Some birds not only imitate airs with correctness, but even learn to pronounce distinctly a few short words. In 1838, there was exhibited in London, a Canary-bird which had been brought up from the nest, and had been taught to imitate, with surprising success, some phrases which had been often addressed to it; thus possessing a faculty never before suspected in the family to which the Canary belongs.

The Canary breeds four or five times a year, and lays four, five, and sometimes six eggs each time. The birds should not be paired till the middle of April; and they should be put either in a very large cage made for the purpose, or else allowed to range about a room. If you put them in a cage, let it be so large that the birds may fly with freedom in it: it is a good plan to have two little boxes for the birds to build in, as they are apt to go to nest again before the young ones fly. Birds which are to be paired for the first time, ought to be placed in the same cage for a few days, that they may become accustomed to each other. If you give the birds the range of a room, nest-boxes should be nailed up in various corners, and moss thrown about the floor; if a wire-gauze blind can be fastened across the window so that the latter may be occasionally left open to allow fresh air to blow freely into the room, it will materially conduce to the health of its inmates. You must take care to furnish your birds, whether in the cage or room, with some fine hay, horse hair, hair of cows and elks, and hogs' bristles, in order that they may make their nests. When the hen has laid about six eggs, she prepares for the process of incubation, which usually lasts thirteen days; and when the young are hatched, it is necessary to put a little jar by the

side of the feeding trough, containing some hard-boiled egg chopped very fine, and a small piece of white bread which has been steeped in water, and afterwards squeezed almost dry; in another vessel should be put some rape-seed which has been scalded, and steeped in fresh water, the greatest care being taken that the rape-seed is not sour, else it will certainly kill the younglings.

When you bring them up by hand, the best food is a kind of paste made of white bread, bruised rape-seed, and a little yolk of egg and water. This paste must be given to the young ones on a thin piece of wood shaped like a spoon; and they should be fed ten or eleven times a day, every time giving them about four beakfuls. The young ones must be suffered to remain with their mothers for about twelve days, by the end of which time they will be fledged, and on the thirteenth day they usually begin to pick up food for themselves; they will require to be fed by hand for twenty-three or twenty-four days; and at the expiration of that time they may be put into separate cages, the bottoms of which should be strewed with fine hay, or well dried-moss. They must however be fed for some weeks on the before-mentioned paste, with the addition of the general food of a full grown bird; and as they gain strength and vigour, the paste may be gradually withdrawn, until at length they become accustomed to their ordinary food, which should consist of summer rape, canary, and poppy, and bruised hemp-seeds; with oatmeal and millet occasionally in the summer, as delicacies. Green food, such as chick-weed, groundsel, radish, lettuce, water-cresses, plaitain, &c. should on no account be omitted; neither should a daily supply of fresh water, for bathing, be forgotten.

The cages for Canaries are more showy and elegant in their shapes and materials, than those for any other birds, gothic, Chinese, and arched, being amongst the most usual patterns; and within the last three or four years, very pretty dome-topped cages made of brass-wire, with surrounding bands and stands of

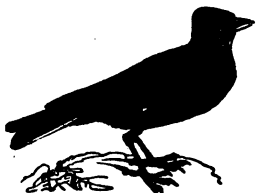


brass, have become fashionable. The gothic cages of wood have frames of mahogany; the top, sides, and front are fancifully wired; and they are usually fitted with two perches, water and seed-glasses, and sliding drawers. The brass dome-topped cages are likewise fitted up with perches and sliding drawer; but instead of glasses for seed and water, little japanned cups are fastened to the lower perches. Canaries being delicate birds, should never be kept in a cold room during winter; for such attempts at naturalization are highly prejudicial to the poor birds, and will, in all probability cause their death. In summer, they may be hung at an open

window where they can enjoy the bright sunshine ; and reveling in its brilliancy and warmth, pour out their full gushing melodies.

### THE SKYLARK.

The lark, whose notes do beat  
The vaulty heaven so high above our heads,



Is one of the greatest favourites of the feathered tribe ; its praises have been sung by poets of all grades, and its pleasing note is the delight of every lover of nature. It will readily imitate the songs of other birds, and also learn tunes ; in confinement it sings during half the year, and may be tamed so as to come and eat from the hand. The Skylark breeds twice a year,

and forms its nest on the ground in high grass, or a wheat-field, or on a common or heath ; the young are hatched by the end of April, and may be taken when about ten or twelve days old ; they should be put into small cages and fed with poppy seeds and the crumb of bread soaked in milk ; to this food, some ants' eggs and a little lean meat will prove a nourishing addition ; some persons give their birds bruised hemp-seed mixed with hard-boiled eggs, chopped fine. When young, the male birds may be detected from the females, by being more yellow in colour, and when arrived at maturity, they are larger in size, not so white on the breast, neither have they so many black spots on the back and breast. The food for full-grown birds, consists of German paste, poppy and bruised hemp-seeds, bruised oats, crumb of bread, and an abundant supply of greens, such as water-cresses, chickweed, lettuce, &c. If the bird be unwell, or his dung becomes loose, add to his food a little grated Cheshire cheese, and some wood-lice, three or four times a day ; or a shred of saffron, some liquorice in his water, and a spider, occasionally. Larks are caught in the day with nooses or with clap-nets ; or with the trammel, at night.



The Lark's cage is plain in its appearance, being painted green without, and white within. The roof is gabled, the back boarded, and there should be a drawer at the bottom ; the front of the cage, from about an inch and a half from the bottom to the lower part of the gabled roof, is bowed ; and on the floor of this bow is placed a tuft

of clover, which should be renewed every other day; the sides and front of the cage are wired, and the places for seed and water may be outside; in some cages, a drawer for the seed is substituted for the little box or glass. Plenty of sand should be spread over the bottom of the cage. Larks are the only birds which sing while winging their way up into mid-air; and their clear strains may be heard even when they have soared far beyond the reach of sight.

## THE TITLARK.



THE Titlark is the smallest of the lark tribe, and is a handsome and slender bird. In the arrangement of its colours it resembles the Skylark; but it is of a rather darker, and more greenish brown in tint than that bird. Its breast is elegantly marked with black spots on a light yellow ground, belly light ash-colour, faintly tinged with dusky streaks; its tail almost black, the two

outer feathers edged with white; its legs are yellowish, feet and claws brown, its bill brown, tipped with black, and its eyes hazel. It breeds twice a year, and makes its nest in a tuft of grass in a field or orchard, or under a bush, or little hillock, and lays four or five eggs at a time. The young may be reared from the nest, if fed upon ant's eggs, and bread soaked in boiled milk, and a few poppy seeds: they learn to imitate the songs of other birds, but never arrive at great perfection in their imitations. The time for catching old birds, or branchers, is from the end of March to the middle of April; but, if taken at a later period, they will not sing much during the first summer; clap-nets are usually employed for the purpose, but limed twigs are also sometimes used; to take them by the latter method, it is necessary to have a caged Titlark as a call-bird, which you take out with you, and when you have discovered a wild one, put your call-bird on the ground, at a few yards from where you heard the other, and scatter a few well-limed twigs round the cage; secrete yourself, and the wild lark hearing your caged bird, will approach, and most probably settle on one of the twigs; the instant he perches, you must rush forwards and take him, else he will free himself from the twigs and escape; tie his wings, put him into a cage, supply him with some meal-worms, ants' eggs, or caterpillars, and bruised hemp-seed, and accustom him, by degrees, to Skylarks' food; that is, give him meal-worms and ants' eggs plentifully for the first day or two, then mix a few poppy and hemp seeds with the worms, and

increase the quantity of seeds gradually. As this lark perches, its cage may have two bars, but, in all other respects, it should be made like the Skylark's cage.

#### THE WOODLARK



Possesses a more musical and sonorous note than most other singing-birds; but its imitative faculties are not very good, for unless it is reared from the nest near some other birds, it will not learn their strains. In plumage, it resembles the Titlark, but the upper parts are not so clearly defined: a white stripe passes from the bill over each eye, toward the

nape of the neck; its under parts are white tinged with yellow on the throat, and red on the breast, and spotted with black; its tail is not so long as that of the other larks; consequently, the bird looks thicker in its shape. It builds a tolerable nest amongst heath, in hedges, high trees, and under little hillocks. The young birds may be reared from the nest, upon bread soaked in milk, and ants' eggs. In June and July, Woodlarks may be caught with a clap-net, and their habitats are principally pasture lands, gravel pits, and heaths. The best food to give them after their capture is a mixture of poppy-seeds and ants' eggs; when they become accustomed to their imprisonment, they may be supplied with poppy-seeds, oats, young wheat, fresh and dried ants' eggs and meal-worms, minced sheep's heart, mutton, veal, or lamb. Some persons, instead of the above food, give their larks finely-bruised hemp-seed mixed with bread; or, some ants' eggs, twice or thrice a day, and a piece of bread which has been soaked in milk. The bottom of the cage should be covered with red sand, and that and the water be changed every day. When the bird is out of order, give him a few meal-worms every day; if he be troubled with a looseness, put some mould full of ants' eggs at the bottom of his cage, and grate a small quantity of Cheshire cheese, or chalk, amongst his food; a shred of saffron and a little piece of stick licorice in his water, will be of service in clearing his voice and causing him to sing freely and powerfully. The cage may have perches, as the Woodlark does not always roost on the ground.

#### THE SONG-THRUSH.

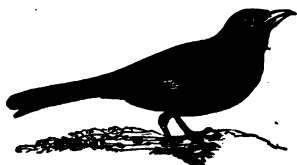
THIS species of Thrush is noted for the fulness and sweetness of its song, which may be heard throughout the summer,



and particularly at the gray dawn of morning and the still evening twilight. Its bill is dusky; eyes hazel; the lesser coverts of its wings and its back and head of a deep olive brown; the tips of its wings white; the lower part of the back and rump tinged with yellow, and its cheeks of a yellowish white with brown spots; and on the breast and belly larger spots of the same colour, likewise on a

yellowish white ground; the tail feathers brown, the two outermost tipped with white; legs yellow, and claws black. The female is very similar to the male in his plumage, save that she is not so brilliant in colour; she lays twice a year from three to six eggs at a time, and the first brood is ready to fly by the end of April. If the younglings be taken from the nest, when half grown, they may be easily reared on white bread soaked in milk, and may be taught to whistle airs. When mature, they are to be fed with the same food as the blackbird, and if out of order, treated in the same manner; they require a plentiful supply of fresh water, both for drinking, and also bathing, to which they are extremely partial. Both males and females will begin to record as soon as they can feed themselves; the males will get on the perch and utter their notes in a low key, while the female will perform by jerks. If you are not certain as to the sex of the birds, keep them till after moulting, when the males will start into full song. The Thrush's cage should be large and roomy, as it is a very animated bird, and brisk in all its movements.

#### THE BLACKBIRD.



BLACKBIRDS pair early in the spring, and the first young are hatched by the end of March; they have usually three broods a year, and lay at each time from four to six eggs of a greenish colour, spotted and streaked with brown.

When the young are hatched, the males are invariably blacker in tint than the females, and therefore very easily distinguished. If you wish to teach the birds to whistle airs, you must take them when the quill-feathers

are just beginning to appear, and they may be easily reared on white bread soaked in milk, a little lean raw beef, and a few worms dipped in water. The most suitable food for these birds, when mature, is bread, meat, either raw, boiled, or roasted; and Woodlarks' food, with the addition of a little bit of apple occasionally.



The cage for blackbirds should be large and roomy; the old-fashioned, peak-topped wicker cage is generally known; but the annexed figure shows an improved cage, in which the rough, homely wicker is blended with the polished mahogany; the top of the cage is gabled, and that and the back are of wood; the two sides and front have, instead of wires, wicker rails, which are strengthened by passing through horizontal bars of wood; the water and food are put into the two little boxes at the sides, and there is a drawer in the bottom; a little pan of water should be often put into the cage, as this bird is very fond of a bath. If he be unwell, give him a few wood-lice, and a large spider; a small quantity of bruised cochineal in the water will make him gay and brisk. Hog-lice are also considered excellent restoratives; but they should be administered with discretion, lest the bird's appetite for other food be taken away by having a superabundance of such delicious fare. The natural tone of this bird is pleasing, but it sounds better in the open air than in a room, as there are many noisy tones intermingled with the others, which interrupt the flow of the melody. Blackbirds may be taught to whistle tunes, and repeat short sentences, in the same manner as the Bulfinch; indeed, they are preferred by many persons to that bird, as their acquired note is highly musical.

#### THE STARLING.



Is an exceedingly docile, gay, and cunning bird; it will learn tunes and sentences, imitate the voices of men and animals, and repeat them with greater facility, and in a stronger and more distinct manner than the Bulfinch; but as it forgets almost as soon as it learns, or at least mingles one tune with another, it is necessary to take the precaution,

while it is under training, to keep it in a room apart from other birds. Its plumage is dark, glossed with green, blue, purple and copper, and the end of each feather has a pale yellow spot; its wing-coverts are bordered with yellowish brown, and the quill and tail feathers more dusky, with light edges; its legs are of a reddish brown; and its bill is straight, sharp pointed, and of a yellowish brown tint, in old birds deep yellow. The Starling builds a very simple nest in holes of trees, rocks, or old walls; it breeds twice a year, and lays from five to seven eggs each time. The younglings, before moulting, are of a yellowish sooty colour; and they may be easily reared from



the nest, by supplying them with white bread soaked in milk. When fully grown, these birds will thrive upon meat, stale bread, cheese, worms, and almost any kind of food, provided it be not sour. When old birds are caught and caged, they must be supplied with earth and meal worms, and they will soon become familiar. A pan of water should be put into the Starling's cage, for it is very fond of a bath. The cage must be at least two feet long, and eighteen inches in height and width; for the Star-

ling, being an extremely restless bird, requires space for the display of its movements. It is as cruel as it is unnecessary to slit the tongue of these birds; for they will speak much better with a whole tongue than a slit one, though many persons imagine the contrary

#### THE NIGHTINGALE.



THE Nightingale is the plainest in plumage, but in song the most varied and beautiful of all birds. Nightingales are migratory, and return to England about the latter end of March, or middle of April, when they may be taken in traps baited with meal-worms, which it is necessary to set near the spot where they have been heard to sing; yet they are so un-

suspicious, that they will notice the fixing of the snare, and then



fall into it. The retreats in which these birds mostly delight are woods, groves, coppices, quickset hedges, and thick brambles, wherever the air is not too cold. When you have secured one, tie his wings together with a thread, and give him some ants' eggs and mealworms. Nightingales usually build their nests in close, quickset hedges; or on the ground, where it is screened by thick bushes, or tall grass; the nests are extremely simple in construction, and the eggs from four to six in number. The period of incubation is generally about a fortnight; and in plumage the young birds, before the first moulting, are so little like the adults, that they might almost be taken for a distinct species; the upper part of their bodies being of a reddish gray colour, and yellowish white spots ornamenting the head and the wing-coverts, while the under parts of their bodies are of a rusty yellow tint, with brown spots on the breast. The males may be distinguished in the nest by being marked with white, and by having white throats; the females are redder and browner in colour than the others. Young females sing as well as males for a month or so, but with a weaker and more interrupted note. When you take the young from the nest, feed them with ant's eggs, mixed with soaked white bread. When the bird is full grown, the whole of the upper parts of its body are of a rusty brown colour, tinged with olive; the under parts pale ash colour, verging to white at the throat and vent; the quills are brown, with reddish margins; the bill is brown, eyes hazel, and legs pale brown. The female is very similar to the male.

The sides and back of a Nightingale's cage are of wood, and the front only wired; the roof may be gabled, and an inch or two below it, a ceiling of baize, or some other soft material, must be strained, so that the bird may not hurt itself as it rises when singing; and the perch must be padded for the same reason; just below the bottoms of the wires in the front of the cage is



placed another and smaller perch, supported upon two stems. The cups for food and water are set in holes made in two small shelves, which are fastened in the front corners of the cage. The bottom should be furnished with a sliding drawer, and the door is usually made at the back of the cage. The cages are generally of mahogany; and the front is embellished with a pediment, and an urn-shaped ornament. A

little pan of water should be put into the cage for the bird to wash himself in; it is necessary to keep the cage perfectly clean, and in a room the temperature of which is never below temperate, as the Nightingale is extremely susceptible of cold. If the bird be out of order, if it puff up its feathers, shut its eyes, and sit for

hours with its head thrust under its wings, give it ants' eggs spiders, and saffron in the water; if the dung be looser than ordinary, administer a little hemp-seed ground fine, mixed up with minced sheep's heart and egg. Whilst moulting, this bird requires succulent food, and a spider now and then, by way of a drastic.

When a Nightingale is newly-caught, put him into a cage, and cover it with a *white* handkerchief — because any darker colour would intercept the light; throw in ten or twelve meal-worms, previously pinching them on the head, to prevent their crawling away, and about a handful of the fresh "eggs," or rather cocoons, of the wood-ant. About half-a-dozen meal-worms may be given every three or four hours, for a day or two, till the bird takes to the eggs; after six or eight weeks they will not be necessary, except for a treat, or as an occasional change of food. As soon as he takes to feed well, he will begin to sing, which will take place, at the longest, in about eight days; and it will be important, unless the cage be kept covered with the *white* handkerchief, to let him remain unmoved, as change of place will often make a Nightingale leave off singing. Ants' eggs should be the principal food, so long as the Nightingale is in song; but when he has left off singing, German paste should be given.

M. Wichterich, of Bonn, recommends the net for catching Nightingales to be made with a semi-circular hoop of iron wire, about the thickness of a swan's quill, raised upon a crossed stick, like the common brick trap; upon which stick fix meal-worms with pins or thorns; and when the bird pulls these, the stick will be deranged, and the net will fall.

#### THE REDBREAST.



THIS pretty little warbler is an universal favourite, from the docility and sociability of its temper, its lively motions, and above all its delightful song. The female breeds twice a year, laying each time from four to six eggs; the young birds do not show any beautiful colours, until they have moulted; they may be reared from the nest without difficulty, if white bread soaked in milk be

allowed them. The plumage of the Redbreast is pleasing, though not showy; the head and all the upper parts of its body are brown, tinged with a greenish olive; its neck and breast are of a fine deep reddish orange tint, and a patch of the same colour marks

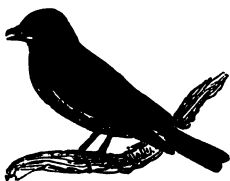
its forehead; its belly and vent are of a dull white; its bill is slender, eyes full, black, and expressive, and its legs dusky. The female is somewhat smaller than the male, and her reddish tints on the forehead and breast are not nearly so brilliant in colour. These birds may be taken in the autumn in nooses baited with elderberries, which they are very fond of, and which should be given to them when they are first put into confinement, as well as earth and meal-worms, &c.; they will soon become accustomed to almost any kind of food, such as cheese, crumbs of bread, and little pieces of meat, and their proper diet is the same as that of the Nightingale. The Redbreast is generally kept in a cage like that of the Nightingale, and a little pan of fresh water should be frequently put in, so that the bird may enjoy a bath. It may be so tamed as to eat from the hand:

"The redbreast pays to trusted man  
His annual visit. Half afraid, he first  
Against the window beats; then brisk alights  
On the warm hearth; then, hopping on the floor,  
Eyes all the smiling family askance,  
And pecks, and starts, and wonders where he is;  
Till, more familiar grown, the table crumbs  
Attract his slender feet."

THOMSON.

#### THE BLACKCAP

Is, by many persons, considered to rank next to the Nightingale in variety and smoothness of song. Its back and wings are of an olive gray, throat and breast of a silvery gray, belly and vent white, sides of the head and back of the neck ash colour, and the top of its head black, whence its name. The female is a little larger than the male, and her distinctive marks are the following:



her cap is brown, the upper part of her body reddish gray, inclining to olive; cheeks and throat light gray; breast, sides, and thighs light gray, tinged with olive; and her belly reddish white: she lays generally once a year, but sometimes twice; the nest is well built, and the eggs are from four to six in number. If you bring up the young ones, it is necessary

to give them white bread soaked in milk; and if they be kept near other birds they will readily imitate their notes. If you be uncertain which birds are males, (for until the first moulting both sexes agree in plumage,) take a few brown feathers from the head, and their places will be supplied with black ones, if the birds be males; the song likewise will infallibly show the sex, as the males begin to sing as soon as they can feed themselves. Old

birds are usually caught by nooses in the autumn : they should be fed upon elderberries and meal-worms for a few days, so as gradually to bring them to their artificial food ; this should be bruised hemp-seed, and a paste made of bread soaked in water, and afterwards steeped in milk, with barley or wheat meal ; or a paste made of hemp-seed, scalded and bruised, and white bread also soaked : these pastes should be mixed up fresh every morning, and when given to the birds, some fresh raw lean meat chopped fine, should be added ; the yolk of an egg boiled hard and crumbled small, is an excellent variation to the general food ; meal-worms, ants' eggs, maggots of the blue-bottle fly, &c., are also very good ; and most vegetables are eaten by these birds with avidity.

#### THE REDSTART.

THE Redstart is a handsome bird, and a very pleasing song bird. It is, like most warblers, migratory, and visits England towards the latter end of March, or the beginning of April. Its plumage is very pretty : its cheeks, throat, forepart, and sides of the neck, to just above the eyes, are black ; the crown of its head, hinder part of the neck, and back, deep purple, gray ; breast, rump, and sides, of a fine glowing red inclining to orange ; and this colour extends to all the tail-feathers, excepting the middle ones, which are brown ; the belly is white, as is also the forehead ; its bill, eyes, feet and claws, are black. The female differs considerably from the male : her colours are less vivid, the top of her head and back being of a gray-ash colour, and throat white. The Redstart builds its



artless nest in old walls or ruins, breeds twice a year, and lays from five to seven eggs at a time. The young ones, if to be reared from the nest, to be taught to warble airs, or to improve their own native strains by imitating the songs of other birds, should be taken when the tail-feathers begin to grow, and fed upon ants' eggs and bread soaked in water. When wild, Redstarts feed upon insects and berries ; and when in captivity, they must always be supplied with insects : they are very fond of ants' eggs, meal-worms, and common maggots, and such food generally as is given to nightingales.

## THE BREEDING-CAGE.



BREEDING-cages may be made either single or double; the size being regulated by the convenience at the disposal of the young fancier. In single cages, the top, front, and sides are usually wired, and the back of wood; but in double cages, both ends are of wood. They should be provided with drawers for food, another

drawer at the bottom, for readiness in cleaning, and glasses for water; besides perches, placed at the most convenient heights for the birds: the door may be made at the option of the builder. A small shelf should be fitted to the boarded back, and from the edge of this shelf a partition should be carried up to the top of the cage, so as to form a private chamber wherein the birds may build their nests, in two small boxes or trays, provided for that purpose; two holes should be made in the partition to allow of free egress and regress; and the materials for building nests, such as hay, elks' hair, down, feathers, and the ravellings of silk or cotton, should be put into a little net pouch, or bag, and hung from the roof of the cage near the perches. Some bird-fanciers recommend the inside of the breeding cage to be washed with lime and water once or twice during the summer, to keep the birds free from insects; but scrupulous attention to the cleanliness of the cage will always preserve its inmates from such annoyances.

## DISORDERS OF TAME BIRDS.

UNDER this head, in addition to the observations inserted with the descriptions of the birds, we shall notice some of the principal disorders to which tame birds are liable, and the usual remedies for them:—

HUSK, or ASTHMA, is a disease of frequent occurrence amongst cage birds: it sometimes arises from cold, proceeding from neglect, and sometimes from the birds having had too much hemp-seed, which, although all birds like it, is over-heating, and incites them to gorge. The symptoms are, shortness of breath, and frequent opening of the beak; and if alarmed, keeping it open for some time. The curatives are aperients, such as a spider or two every day, and endive and water-cresses; occasionally, boiled bread and milk, and bread soaked in water, are also very good. Some persons highly recommend a drink, made by boiling linseed and stick-liquorice in water.

The **PIT** is a cold which stops up the nostrils, and hardens and inflames the membrane which covers the tongue. The symptoms are opening of the beak, its yellowness at the base, and the dryness of the tongue. A composition of pepper, fresh butter, and garlic, is the best remedy; and a feather must be passed up the nostrils, for the purpose of opening them. In large birds, such as domestic fowls, it is usual to remove the inflamed skin, by tearing it off with the nail.

The **SURFEIT**.—The surfeit is a disorder to which young birds are particularly subject, arising either from the parent birds feeding them too much with green food; or from their own gluttonous propensities, when they feed upon the same kind of food. The symptom of this disorder is a swelling under the belly, owing to the bowels sinking down to the lower part of the body, and sometimes turning black. The same kind of protuberance often shows itself when the bird is suffering from a cold, and the disorder is then termed a swelling; in this case, the swelling is at first white, but it afterwards turns red, as in the surfeit. The utmost care must be taken with the poor little sufferers, as few survive the last stages of this malady. Some fanciers recommend whole oatmeal as a good cleansing food during the first three or four days, putting saffron in the water at the same time; if, however, the bird be too loose, maw-seed and bruised hemp-seed, with some groundsel, and saffron in the water, should be substituted. Boiled bread and milk with maw-seed put into it, is by some recommended; as are also millet, hemp, canary, and rape-seeds boiled together, with some hard-boiled egg minced very small, and about as much lettuce-seed as either of the other kinds, added to them. Treacle may be put in the water which you give the birds before you furnish them with their daily supply of seed.

**SWEATING** is a disorder to which some hen-canaries are subject during the time of incubation, or while they are nursing their young. To stop this complaint, which will, unless checked, kill the young brood, some fanciers advise the hen to be washed in salt and water, then dipped in fresh water, and afterwards dried as quickly as possible, either in the sun, or with the help of dry soft cloths before the fire. This bathing and drying should be repeated once or twice a day, until the patient recovers. The best cure for this disorder, however, is to take the hen away, and keep her from sitting.

**OBSTRUCTION OF THE RUMP-GLAND**.—This gland furnishes the oil with which the birds trim their feathers: it sometimes hardens and becomes inflamed, and unless the sufferer pierces it himself, it must be cut or pierced with a needle, the inflammatory matter pressed out, and a little fine sugar dropped on the place; this simple remedy often effects a speedy cure.

**LICE.**—The insects by which many cage birds are annoyed, are principally produced from the carelessness of those who keep them. Old wooden cages are liable to be infested with these pests; they should, therefore, either not be used, or else very frequently attended to; and if a pan of fresh water be put into the cage, it will be of great service in promoting the cleanliness of the birds, as it will enable them to sprinkle themselves.

**OVERGROWN CLAWS AND BEAK.**—When a bird's claws grow long, it is necessary to cut them, otherwise they will be very inconvenient; they must not, however, be cut so short as to draw blood, else the bird will be lamed. The beak also requires paring occasionally; and the scissors for this purpose, and for the claws, should be perfectly sharp.

**MOULTING.**—While suffering from this malady, the birds must be taken great care of, supplied with plenty of nourishing food, and be kept warm. Millet, lettuce, canary, maw, and hemp-seeds, bread soaked in water, and green food should be given to those birds which subsist upon seeds; and an additional supply of meal-worms and ants' eggs, to those which feed upon insects. A little saffron, or a rusty nail, may with advantage be put into the water supplied to the bird.

**LOSS OF VOICE.**—Male canaries sometimes suffer the loss of voice after moulting: they should then be supplied with a paste composed of bread pounded very finely, mixed with well-bruised lettuce, and rape-seeds, tempered with a little yolk of egg and water.

**COSTIVENESS** may be removed by giving such aperients as spiders, plenty of green food, and boiled bread and milk; to those birds which subsist upon meal-worms, one bruised in sweet oil and saffron, will be an exceedingly good alterative.

#### TO MAKE GERMAN PASTE.

This composition may be made in the following manner, of much better quality than that which is sold in the shops. Take four fresh eggs, boiled very hard; a quarter of a pound of white pease-meal; and about a table-spoonful of good salad oil—if the least rancid, it will not do. The eggs must be grated very fine, and mixed with the meal and olive-oil, and the whole then be pressed through a tin cullender, to form it into grains, like small shot: it should next be put into a frying-pan, set over a gentle fire, and gradually stirred with a broad knife, till it be partially roasted and dried, the test of which will be its yellowish-brown colour. All insect-eating birds may be kept upon this food throughout the year, except when they appear drooping and unwell, or at moulting-time, when a few meal-worms may be given to them twice or thrice a day.

## BANTAM, OR DWARF FOWLS.



A yard she had with pales enclosed about,  
Some high, some low, and a dry ditch without.  
Within this homestead lived, without a peer  
For crowing loud, the noble chanticleer;  
High was his comb, and coral-red withal,  
In dents embattled, like a castle-wall:  
His bill was raven-black, and shone like jet;  
Blue were his legs, and orient were his feet,  
White were his nails, like silver to behold,  
His body glittering like to burnished gold.

DRYDEN'S FABLES.

**THE BANTAM, or DWARF COOK,** is the smallest of all gallinaceous birds; but, in pugnacity and resolution, he is equal to most, as he will fight to the last with one much larger and more powerful than himself. His tiny size, pretty plumage, and high-spirited bearing as he struts

“Royal as a prince is in his hall,”

have made him a general favourite, and caused his elevation to that of a fancy bird. The rules respecting the colours and sorting of the feathers, general carriage, and other properties, as settled by fanciers, are the following:—For colours, nankeen and black are the most prized; if the bird be of the first colour, the edges of his feathers should be black, tail-feathers black, breast-feathers black with white edges, wings purple-barred, and his hackles, or



neck-feathers, slightly tinged with purple; and if of the second colour, no feathers of any tint should break the uniform black: in carriage, he should be free and spirited; his comb should be rose-coloured, full hackles, full-feathered tail, and clean legs, bright in colour, and wholly free from feathers: in weight, he must not exceed a pound. The hens must be small, and correspond in plumage with the cock; and, like him, be clean legged.

Bantams should be permitted to range in the open air during the day; and their habitations for the night must be warm, dry, clean and well ventilated: perches should be placed for the birds to roost upon; and some square boxes, with fine soft hay or short straw inside, for building nests. A small piece of chalk may be put into each box as a nest-egg; and it is necessary to take the real eggs away as soon as they are laid. When some of the hens, by clucking, evince a desire to sit, they should be kept in a box, away from the interruption and annoyance of their companions, with from five to nine, or at most, eleven eggs to hatch. Old nests should never be used, and the boxes in which the birds are put up must be scrupulously clean. Incubation continues for twenty-one days; and, during that period, food and water must be placed near the nests, that the hens may satisfy hunger and thirst without being compelled to desert their charge. The food proper for the little chicks consists of split grits, chopped curds, and eggs boiled hard, and cut into very small pieces; as they increase in size, they should gradually be brought to eat the general food allotted to full-grown fowls, which is tail-wheat, barley, oats, &c. Water must be furnished them in little shallow pans, that the chicks may drink without being obliged to hop into the water, and so wet their feet and feathers; for when young, such a cold bath is apt to prove prejudicial to them.

Bantams are liable to the chip, pip, and roup. When suffering from the chip, they sit moping and chipping in corners, nipped up with cold; some mustard, or ground pepper, put into the water, and general warmth, are the remedies. The pip is a white skin, growing upon the end of the tongue: it should be removed with the nail, and the place be rubbed with salt. The roup requires warmth; the bird's nostrils should be washed out with warm water, and pills of butter and chopped rue-leaves administered every day. Full-grown fowls are sometimes attacked by this disease, and it not unfrequently proves fatal.

Booted, or feathered legs, are not exclusively peculiar to Bantams, as is generally supposed: so far from this, Bantam fanciers prefer those fowls which have clean, bright legs, without any feathers. The real Bantam Cock, that is, the native species of Bantam, in Java, is not diminutive, like the little feathery creatures so called in Britain; but is a very large bird, and often tall enough to stand on the floor, and peck off a dining table.

## SILKWORMS.



We are indebted to this little insect for our greatest luxury in clothing; a reflection which ought to humble our pride; for how can we be vain of the silk that covers us, when we reflect to whom we are indebted for it, and how little we are instrumental in the formation of those beauties in our clothing of which we are vain.

STURM'S REFLECTIONS.

It is uncertain at what precise period man discovered the art of converting the delicate labours of the Silkworm to his own advantage; but it is established, that the Chinese, in the remotest ages, carried on the manufacture of silk. From that country, Silkworms were first introduced into the western world, in the time of Justinian, A. D. 552, by two monks, who had long resided in China as missionaries. Observing the myriads of Silkworms kept by the people, and the treatment they required, they became convinced that the importation of so tender and short-lived an insect from so great a distance was impracticable; but imagining that in the eggs a numerous progeny might be preserved and propagated, they concealed some in a hollow cane; and thus bearing in their hands the first staple of eastern commerce, they returned to Constantinople, where Justinian munificently rewarded them.

We now proceed to a few practical instructions for rearing the Silkworm. The eggs may be purchased very reasonably of dealers in physical herbs, birds, &c.; as in Covent Garden

market. Newly-laid eggs are of a pale yellow tint, which soon changes to an ash hue; they are laid by the moth on paper.



Towards the end of April, place the eggs and paper in small and rather shallow trays, which ought to be of good substantial cartridge-paper, with the edges turned up to about the height of an inch all round, and pasted neatly together at the corners.

as shown in the marginal illustration. These trays, containing the eggs, should be removed to a window, where the sun may shine fully upon them; and if they can receive the rays of the mid-day sun, so much the better. Particular care must be taken to place them out of the reach of cats or birds: some persons, indeed, take the precaution of covering them with a piece of fine gauze.

The eggs must now be left until the hatching commences, at which time some mulberry-leaves, or if they cannot easily be procured, some lettuce or dandelion leaves, must be placed in empty trays, made like those already described, to receive the worms, as they come into life. The operation of removing them must be performed very gently, by means of a feather, or of a camel's-hair pencil; because the worm, at this early period of its existence, is exceedingly delicate and tender.

The first tint of this insect is darkish, which, however, turns afterwards to a cream-white; at every joint of each side is a small circle; two semicircles on its back; three feet on each side, near the head; eight holders midway on the body, and two near the tail.

The Silkworm suffers four sicknesses, from the first period of its existence to the time of beginning to spin; each sickness continues about three days, during which it does not eat, becomes thicker and shorter, and casts its skin. Leaves should be given to Silkworms once a day before the first sickness; after that, until the third, they should be fed twice a day, increasing the quantity of food in proportion to the growth; from the third to the fourth periods of sickness, they must be supplied with leaves thrice a day; and, if the weather be very warm, four times. From the fourth crisis, until they commence spinning, the food must be given very frequently; as they then consume more than in the whole previous time of their existence.

Although lettuce-leaves may be given to Silkworms during the first few days, yet as their natural food is mulberry-leaves, the latter should be provided as soon as possible. It must be espe-

cially borne in mind, that they must not be fed upon lettuce, after they have once been furnished with mulberry-leaves, for such a change of food disorders, and ultimately destroys, them. The trays should be cleaned out regularly every morning, until the last sickness, when, as the dirt accumulates much quicker, they require greater attention; at which period also, they should be kept exposed to the air, particularly if the weather be at all favourable. In cleaning out the trays, the Silkworms should be moved with the greatest tenderness: when they are about one-third grown, if fresh leaves be put into the trays, upon the top of the half-devoured ones, the Silkworms will soon crawl on to the fresh leaves, when they may be safely lifted out, and placed in their clean quarters in other trays; when they are full grown, they may be taken up in the fingers, care being observed not to squeeze them, or let them fall. The leaves must be as fresh as possible, but free from damp; and for these reasons, they must be kept closely packed together, and dried in a clean cloth before they are given to the worms.



When about to commence spinning, Silkworms turn of a clear pink, or flesh colour, especially at the tail; they also become exceedingly restless, and will not eat their food. On this last symptom appearing, remove the worms into little paper bags, made in the shape of funnels, wide and circular at the mouth, and terminating in a point. The depth

of these little bags should be about four inches, and they are usually pinned to a tape, point downward, on the wall of a room. Here the Silkworms spin their silken threads, so as to inclose themselves completely in an oval-shaped ball of silk, of about the size of a pigeon's egg. This is called the "cocoon." Within it



the Silkworm once more casts its skin, turns thick, short, and of a dark brown, hard glossy surface; becoming, through this second change, an aurelia, or grub. When the cocoon is about the size before mentioned, but not sooner, you may shake

it gently, to ascertain whether the spinning withinside is complete; and if a slight rattling sound can be heard, as though there was something loose in the cocoon, the spinning is over.

Next wind off the silk; and for this purpose, remove the loose outward silk, and place the cocoon in a basin of lukewarm water, that the end of the silk may be more easily detected, and



wound off upon a common card. The aurelia, when taken out of the cocoon, should be placed in bran, just under the surface, where it will effect another change, becoming a lumpish, inelegant,

white moth. At this stage of its existence, what remains of life? for it seems to be nothing more than the deposition of its eggs: it does not eat, neither does it fly, although furnished with wings; but soon after the development of its wings, it lays its eggs, and dies within two or three days. As soon as the moths emerge from the case, they should be removed to a paper tray, the bottom of which should be covered with clean white paper to receive the eggs; if, however, you wish to preserve a great quantity, it is better to place the moths in a coarse cloth, and immerse it in fresh water, so as to destroy the viscous matter that glues the eggs to it; then dry them well, and keep them together in a box as if they were beads: this is more convenient than using a great number of papers or trays. If this method be adopted, the cloth must not be immersed, until the eggs have assumed their ashy colour.

Where Silkworms are reared for commercial purposes, such a number of aurelias only are preserved, as are necessary for the production of eggs; the others are destroyed by putting the cocoons in hot water, which process greatly accelerates the winding off of the silk; this plan must be adopted if you have a great number of cocoons, for unless you wind off the silk, within ten days or a fortnight after you have ascertained that the worm has ceased spinning, the aurelia, even in its silken inclosure, will turn into a moth, and by piercing through the cocoon, destroy the silk. The silk varies greatly in colour, being of different tints, from white to a rich yellow; but the lighter colours are the most sought after.

The long and tedious process of winding off, may be abridged by using a reel, sold at most Tonbridge-ware shops, which enables the operator to wind two or three threads of silk at the same time.



## DRAUGHTS.



To ascertain, distinctly, consequences in their causes—to calculate with promptitude the result of intricate variety, to elude by vigilant caution the snares of stratagem, are lessons which the game of Draughts strongly inculcates, and uniformly explains.

JOSHUA STURGES.

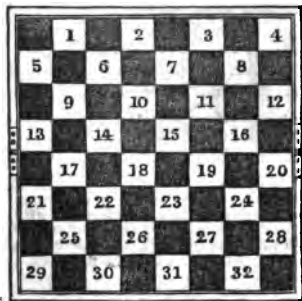
THIS interesting game is believed to be of very remote origin; although no account of it, at least, none specifying its character, occurs before the middle of the sixteenth century. From brief and incidental notices, it would seem to have been known in Greenland about 1050, and, probably, in Wales, A. D. 943, in the time of Howell 'Dha; but be this as it may, the earliest positive account of Draughts is in the year 1551. In the seventeenth century, Taylor, the water poet, mentioned it; and in 1668, Monsieur Mallet, a Parisian professor of mathematics, published an elaborate treatise upon the game.

Draughts, in point of interest and complexity, is second only to Chess; and the learning of it, therefore, forms a fair prelude to the study of that most scientific game. The moves being the result of study, and not of mere chance, the game is consequently not employed as a vehicle for gambling, and no objection to it can possibly arise on that score; for, as the great authority upon the game, Joshua Sturges, observes, "It guards simplicity from the lures of deceit, and prevents cunning from preying on credulity; for where superior skill *alone* commands success, the ignorant are not mad enough to hazard their fortunes in a con-

(275)

test where loss is certain, and gain impossible. Considering the game as an amusement, it cannot be denied that it tends to improve those faculties of the mind which are eminently useful in every condition of life; and may, therefore, be made the school of wisdom, but cannot, like the gambling-table of chance, become the nursery of vice."

The draught-board is a square, divided into sixty-four compartments, alternately checquered black and white. The draughtsmen, which are moved on these squares, according to certain regulations, are twenty-four in number, divided into two sets of twelve each, one set being white, and the other black.



For the sake of perspicuity, and facility of describing the different moves, we give a representation of a board with the squares numbered; and beginners will find it much to their interest, to thus number the corners of the squares on a board itself, as by such a plan they can learn the moves far more readily than otherwise.

On beginning a game, the men should be placed on the white squares, at

the opposite ends of the board, the white occupying the squares 1 to 12, and the black men those marked from 21 to 32 respectively. The board must be placed between the players, so that each has an upper white corner on his right hand. When the men are all arranged in due order, the right of first move should be decided by lot, as should also the choice of men. The men, however, should be exchanged every game, so that each player may alternately use the black and white men; and the first move of each game should be taken alternately also. Ere showing how a game is opened, it is necessary to describe the mode in which the men move.

The men can only progress forward diagonally one square at a time, on the white squares; but if any of them can gain the last row of squares, then such pieces are termed kings, and they may be moved backward as well as forward, of course still keeping on the diagonals. The men take in the direction in which they move, by passing over any opposing piece into the vacant white square behind him; for it must be understood that no other pieces than those which are left unsupported, that is,

those which have a vacant white square behind them, are liable to be captured. If, however, several men are left unsupported, they are likely to be all taken by one move; as, for instance, if there be three white men, on the squares 10, 18, and 26, a black man on 7 may take the whole of them at a time, by leaping first into square 14, then into 23, and then into 30. The three captured men must then be removed from the board; and the victorious piece, having attained to the last row of squares on his opponent's ground, must be dubbed, or crowned a "king;" that is, another piece of the same colour, which may have been taken in the earlier stages of the game, must be put upon him.

Thus much being premised, we proceed to our instructions respecting the commencement of a game. The men being deposited, and the first move settled, seven moves are open to each player to begin with: thus, the front line of black men may move from 9 to 13 or 14, from 10 to 14 or 15, from 11 to 15 or 16, and from 12 to 16 only; the white men move either from 21 to 17 only, from 22 to 17 or 16, from 23 to 18 or 19, and 24 either to 19 or 20. Of these moves, the best for the black is that from 11 to 15; and for the white, from 22 to 18.

Supposing black begins the game by moving 11 to 15, and white responds to it by playing 22 to 18, it is imperatively requisite that at the next move the black man takes the white, by passing over him into the empty square number; else he must stand what is technically termed the "huff," that is, white may either take his opponent's man from the board, without remark, as a penalty for his neglecting to capture, or he may insist upon his own piece being taken. The "huff" is not considered as a move, the white still having the move before his adversary can take his turn. A brief example will illustrate the power of a "king," and render it more intelligible: suppose it a white king's turn to move, whose station is on 32, and that a black king is on square 27, a black man on 18, and another black king on 17, the white king can take all three, and remain upon 21; but if the player neglect to pass over and capture all of them, and content himself with taking only one of the pieces, he must stand the "huff," at the option of his antagonist, who may insist on his taking all. If, instead of a king, it be only a white man on 32, then he can take only the black king on 27, and the man on 18, and assume his place on 14, the black king on 17 removing him at the next move by way of reprisal; this example defines the kingly and common powers, as the latter are never allowed to take by a backward move.

The game is won when one player has captured or blockaded the men belonging to his antagonist, in such a manner, that he has either no piece left to play with, or no space in which to move



those men he has; but when the parties are so equally skilled, that when each has lost many men, and, consequently, neither can gain any great victory, then the game should be given up as drawn. In order to prevent any unnecessary delay in such cases, it has been settled that the person who is the strongest should be compelled to finish the game in a given number of moves. If, for example, there be two black kings with one black man, or three black kings to two white ones, on the board, and the player of the white, perceiving that his opponent, although unable to win, continues to prolong the game with obstinacy, he has the privilege of insisting that the game shall either be finished or given up when forty moves shall have been made by each player. If two kings be matched against one, then the number of moves must not exceed twenty; the moves being, of course, reckoned from the notice given. As a complete game is usually played in a quarter of an hour, it is expected that no player will hesitate for more than three minutes when about making a move; if he do so, his opponent may require him to proceed; and if he pause for five minutes longer, then he is considered to have lost the game.

To have the move is sometimes of great advantage, particularly in critical situations, over a well-skilled adversary. This term "having the move," signifies your holding a superiority of position on the board, by which you may ultimately force your antagonist into a confined situation, and secure to yourself the last move in the game. To ascertain whether you or your antagonist has the move, two plans have been laid down; one of which is, to count the white squares which intervene between the opposing men; and the other, to strike a right angle between them.

So long as each player gives man for man, the move must necessarily belong to each alternately; the first player having it at the odd numbers, 11, 9, 7, 5, 3, 1, and the second at the even, as 12, 10, 8, 6, 4, 2; therefore, before the move can be shifted out of these rules, some error must be committed by one or other of the players.

To find out the move by counting the men and calculating the intervening white squares, or those squares over which the respective men must move, according to the laws of the game, ere they come into contact with each other,—first count the men and squares, and if the men be even and the squares odd, or the squares even and the men odd, the move is yours; and if both be even or both odd, the move belongs to your antagonist. This the following situation will readily explain, white being to play first:—

|       |  |        |  |       |
|-------|--|--------|--|-------|
| White |  | *26 1  |  | Black |
|       |  | 32 28* |  |       |

The adverse pieces are here even, and the white squares odd; as from the white king on 26 to the black king on 28 there intervene three white squares, 31, 27, and 24; and between 32 a white man, and 19 a black man, there are the two white squares, 26 and 23, which make in all, five; consequently, the move belongs to white. White observing that the game is his, moves from 32 to 27; the black king moves from 28 to 32, and the white man on 27 next proceeds to 24, and is taken by the black man, who must be put upon 28; the white king is next moved to 23; the black king, having no alternative, goes to 27, and is captured by the white; and as the black man, whose turn it is to move, cannot play, the game is, of course, finished.

The mode of ascertaining the move by striking a right angle between the men, is a shorter plan than the foregoing, and equally efficacious. If you wish to know whether any particular white man has the move over any one of his opponents, observe carefully the positions of both parties; and if the right angle end in a black square under the black man, white has the move. For example, if white is to play, and his piece is on 30, and his antagonist's man is on three, by drawing a line from each, so as to describe a right angle, you will perceive that the lines cut in the black square between 31 and 32, immediately under 3; and therefore, white has, in that instance, the move. Should, however, the white man be on 25, the lines will cut on 27, showing the reverse of the former experiment. This is a general rule, and will serve for any number of pieces.

The player who opens the game derives no advantage from being first player; for, the men and squares being then even, he cannot have the move; nor can his opponent, although he has it, make it of any importance to himself; and, as we before observed, so long as the players give man for man, the move must, of course, belong to each alternately.

#### LAWS OF THE GAME.

1. The first move of every game must be taken by each player alternately, whether the last was won or drawn; but the first move of the first game of each sitting must be decided by lot.

2. The choice of men for the first game at the beginning of the sitting is also to be decided by lot: but they must be changed every game, so that each player may have the white and black men alternately.

3. The men may be properly adjusted on the squares in any part of the game; but, after they are so placed, whichever player, when it is his turn to move, touches a man, he must play

it somewhere, if practicable; and if the man have been so far moved from his square as to be visibly over the angle separating the squares, and thence indicative of a move, such move must be completed.

4. Pointing over the board, or employing any action likely to interrupt your antagonist, or hinder his full view of the board, is not permitted.

5. When several men are *en prise*, or threatened by the same man at the same time in opposite directions, that is, two one way and one the other, the player whose turn it is to move may take which he pleases; and, as it would be impossible for him to take all the men both ways, no penalty can be exacted for the omission.

6. In the event of standing the "huff," it is at the opponent's option, either to take the man, or insist on the adverse party taking his man omitted by the "huff."

7. When a game has been prolonged to a tiresome length, and only a few pieces remain on the board, without, however, any chance of the players giving up, the stronger party may be required to win the game in a certain number of moves, suppose forty moves for each player, or consider it as a drawn game; the moves, of course, being counted from the notice given. If two kings be opposed to one king, the moves not to exceed twenty for each player. When the odds of the drawn game are given, the game should be continued to a more advanced stage than in other cases; and when the situations become so equal that neither party can gain the advantage, then he who gives the draw must either drive his opponent from his strong position, or be adjudged to have lost the game.

8. Not more than three minutes are allowed for considering a move; if a longer time be taken by each player, his opponent may request him to proceed; and if he pause five minutes further time, after such notice, he loses the game.

9. In the event of a false move being made, such as moving out of turn, or moving a common man backward as though he were a king, the man must be moved to some square, according to law 3, but with this addition, that it shall be moved to wherever the adversary may dictate, consistent with the rules of the game; or, if he so please, the false move may be allowed to stand, as best suits his plan.

10. During a game, neither party can quit the room without the consent of his opponent, otherwise he forfeits the game.

11. If a dispute occur between the two players, it should be referred to a third party, whose decision is to be considered

final, in all cases in which the laws of the game do not offer any explanation: and any player who does not submit to the rules laid down, or abide by the decision of the said third party, is to be adjudged to have lost the game to his adversary.

12. Bystanders must abstain from all remarks during the progress of a game, neither may they advise or interrupt either of the players.

### GAMES FOR PRACTICE.

HAVING now given the general laws and rules of Draughts, we proceed to lay before our readers a few games which it would be well for them to practise on a board, numbered, like the one in the illustration in the early part of this article. We do not wish our pupils to imagine, however, that by playing the following games over in a careless, random style, or in a plodding, mill-horse mode of progression, without endeavouring to comprehend the reason why certain moves are made, that they can ever attain any mastery over the game; on the contrary, unless they strive to understand thoroughly that which they attempt to perform, they will be as far from the mark as though they had never endeavoured to reach it at all. Draughts is a game requiring much circumspection and calculation; and whether it is practised from plans laid down in a book, or learned under the bitterness of frequent defeats, each series of moves must be very carefully studied and worked out. It is scarcely within the range of probability that any two players ever make the exact moves we have set down in the following plans: still, as in the course of games, some points may happen in which the moves bear a resemblance to them, and as the same may be observed with respect to the terminations of games, the young draught-player will find, that if he once become a perfect master of them, he will be enabled to play them whenever an opportunity presents itself.

### GAME I.

| <i>Moves</i> | BLACK.     |           | WHITE.     |           | <i>Moves</i> | BLACK.     |           | WHITE.     |           |
|--------------|------------|-----------|------------|-----------|--------------|------------|-----------|------------|-----------|
|              | <i>fr.</i> | <i>to</i> | <i>fr.</i> | <i>to</i> |              | <i>fr.</i> | <i>to</i> | <i>fr.</i> | <i>to</i> |
| 1            | 11         | 15        | 22         | 18        | 8            | 15         | 19        | 24         | 15        |
| 2            | 15         | 22        | 25         | 18        | 9            | 9          | 14        | 18         | 19        |
| 3            | 8          | 11        | 29         | 15        | 10           | 11         | 25        | 32         | 27        |
| 4            | 4          | 8         | 25         | 22        | 11           | 5          | 14        | 27         | 23        |
| 5            | 12         | 16        | 24         | 20        | 12           | 6          | 10        | 16         | 12        |
| 6            | 10         | 15        | *27        | 24        | 13           | 8          | 11        | 28         | 24        |
| 7            | 16         | 19        | 23         | 16        | 14           | 25         | 29        | 30         | 25        |

\* White loses by this move.

## DRAUGHTS.

GAME I.—*continued.*

| Move | BLACK. |    | WHITE. |    | Move | BLACK. |    | WHITE. |    |
|------|--------|----|--------|----|------|--------|----|--------|----|
|      | fr.    | to | fr.    | to |      | fr.    | to | fr.    | to |
| 15   | 29     | 22 | 26     | 17 | 22   | 23     | 27 | 8      | 4  |
| 16   | 11     | 15 | 20     | 16 | 23   | 27     | 31 | 4      | 8  |
| 17   | 15     | 18 | 24     | 20 | 24   | 31     | 27 | 24     | 20 |
| 18   | 18     | 27 | 31     | 24 | 25   | 27     | 23 | 8      | 11 |
| 19   | 14     | 18 | 16     | 11 | 26   | 23     | 18 | 11     | 8  |
| 20   | 7      | 16 | 20     | 11 | 27   | 18     | 15 |        |    |
| 21   | 18     | 23 | 11     | 8  |      |        |    |        |    |

Black wins.

## GAME II.

|    | WHITE. |    | BLACK. |    |    | WHITE. |    | BLACK. |    |
|----|--------|----|--------|----|----|--------|----|--------|----|
|    | fr.    | to | fr.    | to |    | fr.    | to | fr.    | to |
| 1  | 22     | 18 | 11     | 15 | 13 | 23     | 16 | 10     | 14 |
| 2  | 18     | 11 | 8      | 15 | 14 | 9      | 14 | 24     | 19 |
| 3  | 21     | 17 | 4      | 8  | 15 | 15     | 24 | 28     | 19 |
| 4  | 23     | 19 | 8      | 11 | 16 | 10     | 15 | 19     | 10 |
| 5  | 17     | 13 | 9      | 14 | 17 | 6      | 15 | 17     | 10 |
| 6  | 27     | 23 | 5      | 9  | 18 | 7      | 14 | 22     | 17 |
| 7  | 25     | 22 | 14     | 17 | 19 | 2      | 7  | 17     | 10 |
| 8  | 29     | 25 | 17     | 21 | 20 | 7      | 14 | 13     | 9  |
| 9  | 22     | 17 | 11     | 16 | 21 | 14     | 17 | 16     | 11 |
| 10 | 25     | 22 | 16     | 20 | 22 | 15     | 18 | 26     | 23 |
| 11 | 19     | 16 | 20     | 27 | 23 | 18     | 27 |        |    |
| 12 | 31     | 24 | 12     | 19 |    |        |    |        |    |

Drawn Game.

## GAME III.

|    | WHITE. |    | BLACK. |    |     | WHITE. |    | BLACK. |    |
|----|--------|----|--------|----|-----|--------|----|--------|----|
|    | fr.    | to | fr.    | to |     | fr.    | to | fr.    | to |
| 1  | 22     | 18 | 11     | 15 | 13  | 31     | 27 | 1      | 5  |
| 2  | 18     | 11 | 8      | 15 | 14  | 25     | 21 | 11     | 15 |
| 3  | 21     | 17 | 4      | 8  | 15  | 27     | 24 | 7      | 11 |
| 4  | 23     | 19 | 8      | 11 | 16* | 30     | 25 | 3      | 7  |
| 5  | 17     | 13 | 9      | 14 | 17  | 19     | 16 | 12     | 19 |
| 6  | 27     | 23 | 6      | 9  | 18  | 23     | 16 | 14     | 18 |
| 7  | 13     | 6  | 2      | 9  | 19  | 21     | 14 | 10     | 17 |
| 8  | 24     | 20 | 15     | 24 | 20  | 24     | 19 | 15     | 24 |
| 9  | 28     | 19 | 14     | 17 | 21  | 22     | 8  | 17     | 21 |
| 10 | 25     | 22 | 9      | 13 | 22  | 28     | 29 | 21     | 30 |
| 11 | 29     | 25 | 5      | 9  | 23  | 16     | 12 | 30     | 16 |
| 12 | 32     | 28 | 9      | 14 | 24  | 20     | 2  |        |    |

White wins.

## \* VARIATION, COMMENCING AT THE 16TH MOVE OF GAME III.

|    | WHITE. |    | BLACK. |    |    | WHITE. |    | BLACK. |    |
|----|--------|----|--------|----|----|--------|----|--------|----|
|    | fr.    | to | fr.    | to |    | fr.    | to | fr.    | to |
| 16 | 19     | 16 | 12     | 19 | 20 | 21     | 14 | 3      | 17 |
| 17 | 23     | 7  | 14     | 18 | 21 | 24     | 19 | 15     | 24 |
| 18 | 21     | 14 | 18     | 25 | 22 | 28     | 19 | 17     | 21 |
| 19 | 30     | 21 | 10     | 17 |    |        |    |        |    |

Drawn Game.

## CONCLUDING OBSERVATIONS.

**KEEP** your men as much in the centre of the board as possible, for they then can move into the diagonals on either side, which if they be in the side-squares, cannot be done. Be not over-hasty in your movements, but calculate the moves, so that you may in some measure judge what consequences will follow the steps you take. In calculating the moves, do it mentally; as pointing from square to square is both improper and unbecoming. Be decided in action, and never touch a man without moving it. If one player be stronger than the other, odds should be given to the weaker party, either by giving a man in a rubber of three games, or by allowing the weaker party to consider all the drawn games of the sitting as won by him. Avoid conversing with the intention of annoying your opponent. Never triumph over a vanquished opponent; and if you be repeatedly defeated, let it stimulate you to fresh exertions, so that, in your turn, you may be the conqueror.



## DOMINOES.



DOMINOES.

**DOMINOES** is a game of modern invention; and, though far inferior to draughts, and immeasurably below chess in point of intricacy, still, it requires much attention and practice to make a skilful player.

This game is played by two or four persons, with twenty-eight oblong pieces of ivory, plain at the back, but on the face divided by a black line in the middle, and indented with spots from one to a double-six; these pieces are, a double blank, ace-blank, double-ace, deuce-blank, deuce-ace, double-deuce, trois-blank, trois-ace, trois-deuce, double-trois, four-blank, four-ace, four-deuce, four-trois, double-four, five-blank, five-ace, five-deuce, five-trois, five-four, double-five, six-blank, six-ace, six-deuce, six-trois, six-four, six-five, and double-six. Sometimes a double set is played with, of which double-twelve is the highest.

At the commencement of the game, the dominoes are well mixed together, with their faces upon the table. Each person draws one; and, if four play, those who choose the two highest are partners, against those who take the two lowest; drawing the latter also serves to determine who is to lay down the first piece, which is reckoned a great advantage. Afterwards, each player takes seven pieces at random. The eldest hand having laid down

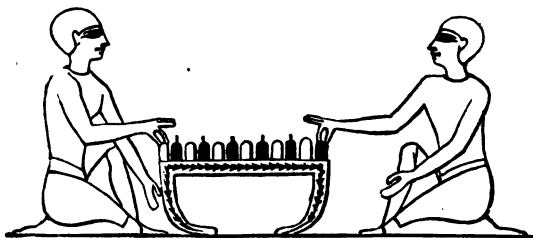
one, the next must pair him at either end of the piece he may choose, according to the number of pips, or the blank in the compartment of the piece; but whenever any one cannot match the part, either of the domino last put down, or of that unpaired at the other end of the row, then he says "*go*;" and the next is at liberty to play. Thus they play alternately, either until one party have played all his pieces, and thereby won the game, or till the game be *blocked*; that is, when neither party can play, by matching the pieces, where unpaired, at either end; then that party wins who has the smallest number of pips on the pieces remaining in their possession. It is to the advantage of every player to dispossess himself as early as possible of the heavy pieces, such as double-six, five, four, &c.

Sometimes, when two persons play, they take each only seven pieces, and agree to *play or draw*; i. e., when one cannot come in, or pair the pieces upon the board at the end unmatched, he is then to draw from the fourteen pieces in stock till he finds one to suit.





## CHESS.



ANCIENT EGYPTIANS PLAYING AT CHESS, FROM A PAINTING AT BENI HASSÂN.

"THE NOBLE GAME" OF CHESS stands pre-eminent above all sedentary amusements, for its fascinating attractions. Complex in its situations, and in its principles, it requires the fullest exertion of the faculties to arrange your own plan of operations, and to watch the slightest movements of your opponent; so to calculate the moves which it is probable he will make, that you may be ready to thwart them at the instant, and to carry out your own scheme through a stern opposition.

The history of Chess is involved in great obscurity: it seems to have been practised in Hindostan for many ages, and therefore, on the authorities of Sir William Jones, and Dr. Hyde, the invention of the game is most generally ascribed to the natives of India; and it is stated to have been brought into Europe by the Persians and Arabs. That Chess was known to the Egyptians, at the remotest periods of antiquity, is evinced by paintings on the walls of some of their temples, showing persons engaged in the game, and also by Chess-men of a very primitive form having been found at Thebes;\* but whether the game was invented by the Egyptians, or introduced into their country by traders from the East, is doubtful.

Chess must, however, have been introduced into England in the latter end of the tenth century, as it is mentioned of King Canute, that during his war with the kings of Norway and

---

\* Our young readers may see several of these ancient chessmen in the Egyptian room, in the British Museum.

Sweden, he one day paid a visit to his brother-in-law, Earl Ulfr, who prepared a repast for him, but which, from being out of spirits, he did not enjoy. The earl, observing him dispirited, at length, challenged him to play at Chess, and the king accepting the challenge, they sat down; the king making a false move after playing a little while, one of his knights was taken by the earl, who, of course, moved it from the board. This move the king would not allow, but replaced the piece, and commanded the earl to play differently. Ulfr, excessively chagrined, overturned the Chess-board, and left the room; and, as he retired, the king exclaimed, "Ulfr, thou coward, dost thou thus flee?" The earl, hearing this epithet, returned to the door, and retorted, "You would have taken a longer flight in the river Helga, had I not come to your assistance when the Swedes beat you like a dog; you did not then call me coward!" He then again withdrew, and was murdered a few days subsequent, by the king's orders. We find also, that when Bishop Cætheric went to King Canute, upon some extremely pressing business, about midnight, he found him and his courtiers deeply engaged at play, some busy at dice, and others at Chess.

The great-grandfather of William the Conqueror was skilful at Chess; and the Conqueror himself is traditionally reported to have been fond of the game. The crusades made Chess more popular than it had hitherto been; and in the eleventh century it was well known. In the reign of Henry II., according to Ger-vase of Tilbury, the court of Exchequer received its name from the cloth spread in the court being chequered after the fashion of a Chess-board.

Chess was a favourite game in the reign of Edward IV., if we may judge from the circumstance that a treatise upon it was published by Caxton, in 1474; and which, indeed, is worthy of especial remembrance, from its being the first book ever printed in England.

Chess was certainly a fashionable amusement in the houses of people of rank in the time of Richard III. Queen Elizabeth was a Chess-player; and her successor, James I., styled the game a philosophic folly. Charles I. was engaged at Chess when he was informed that the Scots had finally determined upon selling him to the English: but he coolly finished the game without betraying any discomposure.

Our limits forbid our entering more fully into the history of Chess, or to give more anecdotes connected with it; but as, at the head of this little introductory sketch of the game, we have prefixed an illustration, showing two Egyptians playing at it, we will conclude by a representation of a king, queen, bishop, and knight, copied from a set of very ancient and singularly curious Chess-men, which are now deposited in the British Museum.

They were discovered by a peasant in the year 1831, whilst digging on the sea-shore, in the parish of Uig, in the Isle of Lewis, Scotland; and, from the peculiar costume of the figures, and the material of which they are made, being the ivory teeth of the walrus, or sea-horse, it is supposed that they were sculptured in Iceland, in the twelfth century.



SUPPOSED ICELANDIC CHESS-MEN.

#### THE CHESS-BOARD AND CHESS-MEN.

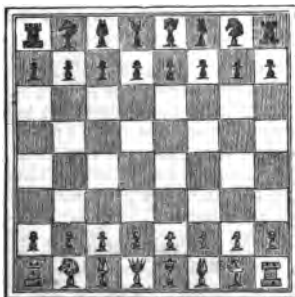
**THE CHESS-BOARD**, or, as it is technically termed, the **EXCHEQUER**, is a square board, divided off into sixty-four compartments, or squares, chequered alternately black and white. The rows of squares running from one player to the other are termed *files*; those crossing from left to right, *ranks*; and the lines from corner to corner, *diagonals*.

**CHESS-MEN.** Each player is provided with sixteen pieces, or *men*; of these, eight are *pawns*, two *castles*, two *knight*s, two



CHESS-MEN MODELLED BY FLAXMAN.

*bishops*, one a *queen*, and one a *king*. These pieces are usually made from bone or ivory; one set being perfectly white, and the other stained red. The shapes of the men exhibit every variety of outline it is possible to imagine, from very ungainly efforts of the turner's skill to most elaborate specimens of Indian workmanship; therefore, we refrain from bestowing an illustration upon them, preferring to call our readers' attention to the foregoing representation of the exquisite Chess-men modelled by the late J. Flaxman, R.A., for Messrs. Wedgwood, and sets of which may be purchased at some of the manufacturers' of Chess-men. They are made of china, one set being pale blue, and the other white, and have an elegant effect during the movements of the game.



The chess-men must be ranged at the ends of the board on the two last rows of squares. The pawns must occupy the inner row; and on the outer, the pieces must be disposed thus: the right hand corner square must be filled with a white castle, the next with a knight, the next with a bishop, the next to that with the king, then the queen, and after him the other bishop, knight and castle. The black men are ranged in the same order, so

that the kings face each other, queen opposes queen, and bishops, knights and castles, oppose their differently coloured brethren. The bishop, knight, and castle, are styled after the party near which they stand: thus, the bishop, knight and castle, next the king, are called the king's bishop, king's knight, and king's castle; whilst, those on the queen's side, are called after her. The pawns are supposed to belong to the pieces before which they stand: for instance, the pawn in front of the king, is termed the king's pawn; the next to it, the king's bishop's pawn; adjoining that the king's knight's pawn, and the king's castle's pawn; and so likewise of the pawns before the queen and her followers.

The squares on which the pieces are placed at the beginning of a game, are called after the names of the pieces which so occupy them: thus, the squares on which the kings stand, are called the *king's squares*, and those whereon the queens stand, the *queen's squares*, &c. The second row of squares on which the pawns stand, are considered the second squares of the pieces, and referred to as the king's second square, queen's second square, &c. The

third row on the board, is the third row of the pieces; and the fourth, fifth, sixth, seventh, and eighth rows of squares, are the corresponding squares of the pieces; the four last rows, of course, being those of the adverse party.

It is necessary always to distinguish the pieces according to their respective colours, as red king's pawn, bishop, &c.; white king's bishop, pawn, &c. The squares on which they stood at the commencement of a game, retain their names, although the pieces are at different parts of the board.

#### VALUE AND MOVES OF THE PIECES.

The relative value of the pieces can only be estimated in a general way, as in some cases a pawn is of more worth than a queen; and at the latter end of a game the rooks rise in power, whilst the queens alightly decrease.

The KING being the chief personage, and free from all chance of capture, is beyond all price. He moves only one square, either way at a time; either backward, forward, or sidewise; but in the course of a game he may make a movement called "castling," which we shall hereafter describe—thus, although limited at the commencement of a game, the king's power increases towards the latter end. The opposing kings can never get nearer to each other than the distance of a knight's move.

The QUEEN is the most powerful and valuable of all pieces, being worth twelve pawns, or three minor pieces, at the beginning of a game; but as, towards the end, the power of the other pieces rises, her importance is then somewhat lessened. The queen may move in any direction, backward, forward, diagonally, and sidewise, and over as many squares as chance to be uninterrupted.

The ROOK or CASTLE is next in value to the queen. It is equal to five pawns, or a bishop and two pawns, and is the only piece which keeps its full value as it approaches the side of the board. The rook and queen are the only pieces which can singly give checkmate. The moves of the rook are straight forward, backward, or across, but never in the diagonals; and it may move over any number of squares, to take a piece, provided nothing hinder it.

The BISHOP is worth about three pawns and a half; but the king's bishop is of more value than the queen's, inasmuch as he can check the opposing king on his own square, or after he has castled. Toward the end of a game, two bishops are more powerful than two knights, as they can checkmate, which the knights cannot, though one bishop is not so strong as one knight;

during the progress of a game, however, the knights are more useful. The bishop moves only diagonally, and therefore never leaves the colour he is first placed upon, as a glance at the board will show. Each player has a bishop on a white diagonal, and one on a black.

The KNIGHT is of equal value with the bishop. His erratic moves are very peculiar, as he moves one square diagonally, and then one forward, to a square of a different colour, to that from which he started. The knight is the only piece which can play over any piece or pawn; and the nearer he is to the centre of the board, the more useful and powerful he becomes. A white knight put on the white king's fourth square, commands eight squares, as follows:—Q. 2nd square; Q. Bp. 3rd square; Q. B. 4th square; Q. 6th square; K. B. 6th square; K. Kt. 5th square; K. Kt. 3rd square; and K. B. 2nd square. As may be imagined, the knight can move in every direction, either backward, forward, or sidewise.

The PAWN is the lowest of all in value, as it can only attack two points at a time, and but one if on the files at the edge of the board. Its move is straight forward, one square at a time; and thence it never deviates from the file on which it is first planted, unless it captures a piece, in which case it moves diagonally, similar to the bishops, but limited to the adjoining front row of squares. At the first move, the pawn may be played two squares. When a pawn reaches the eighth row of squares on the board, it attains the power of queen, and may be exchanged for any piece the player pleases. The centre pawns are more valuable than the side ones, but they seldom reach the queenly power, on account of their exposure to attacks. The pawn cannot move backward, and is the only piece so limited in its power.

#### LAWS OF CHESS.

1. The chess-board must be so placed, that each player has a white corner square on his right hand. If wrongly placed, and four moves on each side have not been played, either party may insist upon recommencing the game.

2. If any of the pieces be placed upon wrong squares, or any of them omitted to be placed, the error may be amended, provided four moves on each side have not been played.

3. If you undertake to give odds, and neglect to remove the piece or pawn you propose giving from the board, you may take it off ere four moves are played. However, if the fault be not rectified in time, you must play the game out; and if you give checkmate, the game can be accounted only as drawn.

4. If no odds be given, lots must be drawn for first move ; after the first game, the moves are taken alternately. Drawn games not being reckoned as games, the player who began the drawn game, therefore, begins the next. If you give odds, you may take which coloured men you like ; but in playing even, lots should be drawn for choice of men.

5. The player giving the odds of a piece, may give it from whichever side he pleases ; though if a pawn be given it is the king's bishop's pawn, and he has a right to take the first move.

6. If a player touch a man, when it is his turn to move, he must play it unless at the instant he says "*J'adoube*," a French phrase, signifying, I arrange or replace ; but should a piece by chance be overturned or replaced, the party to whom it belongs may replace it.

7. If a player touch one of his antagonist's men without saying "*J'adoube*," he must take that piece, if possible, or play his king, at the option of his opponent. But if the piece cannot be taken, nor the king moved without his going into check, then no penalty can be exacted.

8. So long as a player *holds* the man which he has touched, he may play him where he pleases ; but the instant he quits his hold, he completes the move, and cannot recal it.

9. If a player move a piece belonging to his opponent, he may be compelled to take it, if it can be taken ; to replace it and move his king, or else to leave it where he played it.

10. If a player capture one of his opponent's pieces with one of his own that cannot take it, without committing a *false move*, his opponent may insist either upon his taking such piece with one which can legally take it, or on his playing the piece he touched.

11. If a player take one of his own pieces with another, his opponent may insist upon his moving either of them.

12. If a player make a *false move*, such as giving the queen the move of a knight, &c., his antagonist may compel him either to let the piece remain where he played it, to put it in its right move, or to replace it where it originally stood, and then to play the king instead.

13. If a player move twice in succession, the opposing party may, if he choose, insist upon the second move remaining.

14. A pawn advancing two squares, may be captured by one of the opposite pawns "*en passant*."

15. The king may not be castled, if he has been moved, or if he

be in check ; or if, when castling, either of the squares he must go upon be in check, or if the rook with which he endeavours to castle, has been moved. If, however, a player castle in any of these cases, it is at his antagonist's option to allow the move to remain, or the pieces to be replaced, or insist upon his playing his king or rook. A piece cannot be taken when castling. A player giving the odds of the rook may castle on that side, as if the rook were on the board.

16. If a player touch a piece or pawn, which he cannot move without leaving his king in check, his opponent may request him to move the king ; if the king, however, cannot be moved, the mistake occasions no penalty.

17. If a player give check, and fail to warn his adversary of it by saying "check," his opponent is not obliged to notice it, but may go on without paying attention to the check. If, after one or more moves, the king should be still in check, and the error is then discovered, the whole of the subsequent moves must be put back, and the king moved out of check, or a piece interposed.

18. If a player find that his king is in check, and has been so during two or more moves, without his knowing how it originated, he must recal his last move, and liberate his king. But if it is found out how the check occurred, then all the moves made after the check happened, should be recalled, and the check attended to.

19. If a player say "*check !*" without giving check in reality, and if his opponent, through that saying, has moved his king or any other piece, he *may withdraw his last move*, provided he finds that his king be *not* in check previous to his antagonist's moving.

20. If a pawn reach its *eighth square*, or the opposite end of the board, it may be replaced by a queen, rook, or any other piece the player chooses ; this law holds good if the player has not lost a piece, so that he may have two queens, three rooks, &c., on the board at once.

21. If a player towards the finish of a game possess a superiority of numbers, he must give checkmate in fifty moves, or the game is reckoned drawn ; as, for instance, if he have a king, a bishop, and a knight opposed to a king only, he should checkmate in fifty moves on each side at most, to commence from the time his antagonist gives him notice, otherwise he must suffer it to be a drawn game. If a player agree to check with a *particular piece or pawn*, or *on a particular square*, or *engage to make his adversary checkmate or stalemate him*, he is not restricted to any number of moves



22. Stalemate is a drawn game.

23. No penalty can be inflicted upon an adversary for making false moves, unless you take notice of such mistakes before you move or touch a piece.

24. Disputes upon situations respecting which there is no law, should be referred to a third party, whose decision must be received as *conclusive and without appeal*.

#### TECHNICAL TERMS USED IN CHESS.

**CASTLING** is a movement of the king and either of the rooks, which can be made only once in a game by each party, under certain limitations. This move is thus performed:—In castling with the king's rook, place the king upon the king's knight's square, and the king's rook on the king's bishop's square; and when castling with the queen's rook, play the king to the queen's bishop's square, and the queen's rook to the queen's square. In either case, the king passes over two squares, and the rook is brought over and placed on the adjoining square.

**CHECK.** When the king is attacked, he is in check; that is, when he is in such a position that, were he any other piece, he would be taken. But as a king at chess can never be taken, he is said to be *in check*. There are three sorts of checks: a simple check, a double check, and a check by discovery. The first is when the king is attacked by the piece that is moved. The second is when two pieces give check at once; and the third takes place when from moving a piece away a check is opened from another piece; for instance, put your king on his own square, and your opponent's queen on her king's second square; let there be no other piece on the squares on that file, and place your opponent's queen's bishop on his king's third square; you will then readily perceive that this bishop hinders his queen from checking you; but when he moves his bishop to another square, he *discovers check* from the queen. A check can be done away with only by moving the king, or interposing a piece between; or else by taking the piece which gives the check.

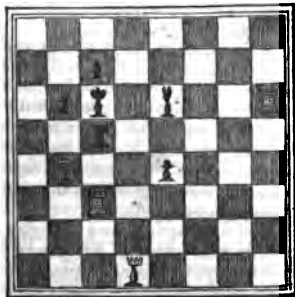
**PERPETUAL CHECK** is a continual alternation of checks, in which the king avoids one only to fall into another. Suppose the men are thus placed:—

**BLACK.**  
K. at K. Kt. sq.  
P. at K. Kt.'s 2nd sq.  
Q. at her R. 7th sq.  
Q. R. at his 6th sq.

**WHITE.**  
K. at K. R. sq.  
Q. at K. sq.

The white having the move can draw the game, checking at the opposite king's square, again at the adverse king's castle's fourth square, and back again at adverse king's square, and so on, *ad infinitum*.

**CHECKMATE.** The king is said to be *checkmated* when he can neither move out of check, capture the piece which checks, nor interpose any piece to protect himself. The player checkmated, of course, loses the game.



The annexed diagram\* shows a position of the pieces, in which, at the next move, the king will be checkmated; and this move must be the queen to her fifth square. The king cannot take her, as the pawn would then capture him; nor can the bishop take the queen, as the white king's rook might take the king; nor could the rook take the queen, as the white queen's rook would carry off the king; so that all the squares

being guarded, he is, of course, checkmated.

**STALEMATE.** A king is stalemated when all the men of the set to which he belongs are either off the board, or so opposed that they cannot move; and he himself in such a situation, that, though not actually in check, he cannot move without going into check. Stalemate is a drawn game.

**FOOL'S MATE.** This checkmate happens to beginners, and is the shortest which can possibly occur, being given in two moves, thus:

**BLACK.**

- 1 K. B. P. one square
- 2 K. Kt. P. two squares

**WHITE.**

- 1 K. P. two squares
- 2 Q. to K. R. fifth square, check-mating.

**SCHOLAR'S MATE** also occurs to beginners, and is thus played:

**WHITE.**

- 1 K. P. two squares
- 2 K. B. to Q. B. fourth square
- 3 Q. to K. R. fifth square
- 4 Q. takes K. B. P. and checkmates

**BLACK.**

- K. P. two squares
- K. B. to Q. B. fourth square
- Q. P. one square

\* From Lewis.

**DOUBLED PAWN** is a pawn which has passed from its original file to another, through capturing an opposing piece; and which, consequently, stands on the same file as another of its own colour.

**PASSED PAWN.** A pawn is said to be *passed* when there is no opposing power to hinder its progress to the queenly dignity.

**TO QUEEN A PAWN, QUEEN THE PAWN, OR THE PAWN GOES TO QUEEN.** These terms are applied to a pawn which has reached the last row of squares, and for which you may demand a queen.

**MINOR PIECE** is applied to the bishops and knights.

**J'ADOUBE** is a French phrase, denoting "I replace," or "I adjust."

**EN PASSANT.** Taking "en passant" is when, at the pawn's first starting, it is played two squares at once, and passes over a square threatened by a pawn of your adversary's, who has the privilege of taking it, as if it had only moved one square; thus: if you have a pawn on your king's second square, and your opponent has a black pawn on his queen's fifth square, and another pawn on his king's bishop's fifth square, and you play your pawn one square, he can take it with either of his pawns; and if you move your pawn two squares, your opponent may take it as if it had moved only one square, inasmuch as it passes over a square, the white king's third, which is commanded by one of his pawns.

**TO GAIN THE EXCHANGE.** If a player gain a rook for a minor piece, he is considered to have gained the exchange.

**DRAWN GAME** happens when neither player can give checkmate, and this may occur in several ways, thus:—when there are not men enough on the board; when both players continue making the same moves; when there are enough men on the board, but the players know not how to checkmate in fifty moves; when perpetual check is maintained on the antagonist king; when each party has a small and equal number of powerful pieces; and when either king is stalemated.

**EN PRIS.** A piece or pawn which can be taken by another is *en prise* of that piece, unless it be moved.

**GAMBIT** is an opening, in which the bishop's pawn is given up for an attacking position. As we shall give examples of several gambits in the next section, upon "Opening the game," we refer our readers to them for further elucidation.

## OPENING THE GAME.

There are several methods of beginning a game at Chess, the most usual of which are as follows :\*

1. **THE KING'S BISHOP'S OPENING.** In this game, each player commences by moving his *king's pawn two squares*; the first player then moves his *king's bishop to queen's bishop's fourth square*, and his opponent makes the same move.

2. **THE KING'S KNIGHT'S OPENING.** Each player, in this opening, moves his *king's pawn two squares*; and the first player next moves his *king's knight to king's bishop's third square*.

3. **QUEEN'S BISHOP'S PAWN'S OPENING.** In this, each player moves his *king's pawn two squares*, and the first player shifts his *queen's bishop's pawn one square*.

4. **KING'S GAMBIT.** After each player has moved his *king's pawn two squares*, the first player moves his *king's bishop's pawn two squares*.

5. **QUEEN'S GAMBIT.** Each player moves his *queen's pawn two squares*, and the first player then moves his *queen's bishop's pawn two squares*.

6. **THE MUZIO GAMBIT** is a very brilliant opening, and is made by sacrificing a knight, thus :—

## BLACK.

- 1 K. P. two squares
- 2 K. B. P. two squares
- 3 K. Kt. to K. Bp. 3rd sq.
- 4 K. B. to Q. B. 4th square
- 5 Castles

## WHITE.

- 1 K. P. two squares
- 2 P. takes P.
- 3 K. Kt. P. two squares
- 4 K. Kt. P. one square
- 5 K. Kt. P. takes Kt.

7. **THE BISHOP'S GAMBIT** is a difficult but interesting game, and differs from the foregoing gambits on the third move :—

## WHITE.

- 1 K. P. two squares
- 2 K. B. P. two squares
- 3 K. B. to Q. B. fourth sq.

## BLACK.

- 1 The same
- 2 P. takes P.
- 3 Q. checks.

8. **THE SALVIO GAMBIT** is a variation from the king's gambit, and is thus played :—

## WHITE.

- 1 K. P. two squares
- 2 K. B. P. two squares
- 3 K. Kt. to B. third square
- 4 K. B. to Q. B. fourth sq.
- 5 K. Kt. to K. fifth square
- 6 K. to B. square

## BLACK.

- 1 K. P. two squares
- 2 P. takes P.
- 3 K. Kt. P. two squares
- 4 K. Kt. P. one square
- 5 Q. checks
- 6 K. Kt. to K. B. third sq.

---

\* Lewis.

There are many other openings and gambits in use at the commencements of games, but the foregoing are the most generally followed, and will be found sufficient for the first attempts: we, therefore, proceed to the

## GAMES FOR PRACTICE.

## GAME I. FROM LEWIS.

## WHITE.

- 1 K. P. two squares
- 2 K. B. P. two squares
- 3 K. Kt. to K. B. third square
- 4 K. B. to Q. B. fourth square
- 5 K. Kt takes K. Kt. P.
- 6 Q. checks
- 7 Q. to K. B. 7th sq. checking
- 8 Q. to her 5th sq. checking
- 9 Q. to K. 5th square checkmating.

## BLACK.

- 1 K. P. two squares
- 2 P. takes P.
- 3 K. Kt. P. two sqrs.
- 4 K. B. P. one square
- 5 P. takes K.
- 6 K. to his 2nd square
- 7 K. to Q. 3rd square
- 8 K. to his 2nd square

## GAME II. FROM GRECO.

## WHITE.

- 1 K. P. two squares
- 2 K. Kt. to B. third
- 3 K. B. to Q. B. fourth
- 4 Q. B. P. one square
- 5 Q. P. two squares
- 6 P. takes P.
- 7 Q. Kt. to B. third
- 8 Castles
- 9 P. takes Kt.
- 10 Q. to Q. Kt. third
- 11 K. B. takes P. checking
- 12 Q. B. attacks Q.
- 13 K. Kt. to K. fifth
- 14 K. B. to K. Kt. sixth
- 15 Q. to K. B. 3rd checking
- 16 K. B. takes B.
- 17 K. B. to K. sixth dis. ch.
- 18 B. takes B.
- 19 Q. takes P. checks and Mates next move.

## BLACK.

- 1 K. P. two squares
- 2 Q. Kt. to B. third
- 3 K. B. to Q. B. fourth
- 4 K. Kt. to B. third
- 5 P takes P.
- 6 K. B. checks
- 7 Kt. takes K. P.
- 8 Kt. takes Kt.
- 9 B. takes P.
- 10 B. takes R.
- 11 K. to B. square
- 12 Q. Kt. to K. second
- 13 K. B. takes pawn
- 14 Q. P. two squares
- 15 Q. B. covers
- 16 B. takes Kt.
- 17 K. B. to B. third
- 18 P. takes B.

## GAME III. FROM CANZENOVE.

## WHITE.

- 1 K. P. two squares
- 2 K. B. to Q. B. fourth

## BLACK.

- 1 K. P. two squares
- 2 Q. B. P. one square

- |                                  |                            |
|----------------------------------|----------------------------|
| 3 Q. to K. second                | 3 Q. to Q. B. second       |
| 4 Q. B. P. one square            | 4 K. Kt. to B. third       |
| 5 K. B. P. two squares           | 5 Q. P. one square         |
| 6 K. B. P. advances              | 6 Q. P. advances           |
| 7 K. P. takes P.                 | 7 Q. B. P. takes P.        |
| 8 B. checks                      | 8 Q. B. covers             |
| 9 B. takes B.                    | 9 Q. Kt. takes B.          |
| 10 Q. P. two squares             | 10 K. P. advances          |
| 11 K. Kt. to R. third            | 11 Castles                 |
| 12 Castles                       | 12 K. B. to Q. third       |
| 13 K. Kt. to B. fourth           | 13 K. R. P. one square     |
| 14 Q. to K. B. second            | 14 Q. Rt. to K. Kt. fifth  |
| 15 Q. to K. second               | 15 K. R. P. one square     |
| 16 Kt. takes Q. P.               | 16 B. takes R. P. checking |
| 17 K. to corner                  | 17 Q. to Q. third          |
| 18 Q. takes K. P.                | 18 K. R. to K. square      |
| 19 Q. to K. B. third             | 19 K. Kt. P. one square    |
| 20 Q. B. to K. Kt. fifth         | 20 K. B. P. one square     |
| 21 B. to Q. second               | 21 K. Kt. P. one square    |
| 22 Q. Kt. to R. third            | 22 Q. R. P. one square     |
| 23 Q. Kt. to Q. B. fourth        | 23 Q. to Q. B. third       |
| 24 Q. Kt. to R. fifth            | 24 Q. to Q. Kt. fourth     |
| 25 Q. B. P. one square           | 25 Q. to Q. R. fifth       |
| 26 K. Kt. to Q. Kt. sixth ch.    | 26 Kt. takes Kt.           |
| 27 Q. takes Q. Kt. P. checkmate. |                            |

## GAME IV. FROM LEWIS.

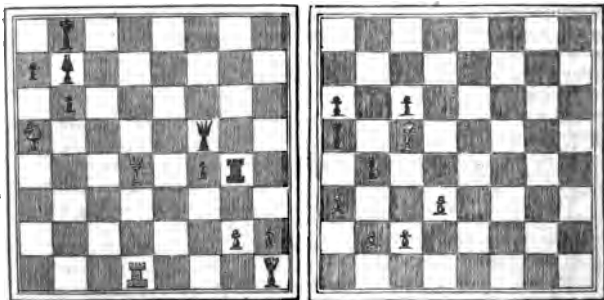
## WHITE.

- 1 K. P. two squares
- 2 K. B. to Q. B. fourth
- 3 Q. B. P. one square
- 4 B. takes P.
- 5 Q. to Q. Kt. third
- 6 B. takes Q. K. P.
- 7 Q. takes B.
- 8 Q. takes R.
- 9 Q. to Q. Kt. seventh
- 10 Kt. covers check
- 11 K. R. to B. square
- 12 Q. P. one square
- 13 K. Kt. to Kt. third
- 14 Kt. to K. fourth
- 15 Q. to Q. Kt. third
- 16 K. moves
- 17 P. takes K.
- 18 K. moves

## BLACK.

- 1 The same
- 2 The same
- 3 Q. P. two squares
- 4 K. Kt. to B. third
- 5 Castles
- 6 Q. B. takes B.
- 7 Q. to Q. sixth
- 8 Q. B. P. one square
- 9 Q. takes K. P. checking
- 10 Q. takes K. Kt. P.
- 11 K. Kt. to Kt. fifth
- 12 Kt. takes R. P.
- 13 Kt. takes R.
- 14 Q. to K. Kt. eighth
- 15 Kt. to K. Kt. 6th disco. ch.
- 16 Kt. takes Kt. checking
- 17 R. checks
- 18 Q. checkmates.

The annexed problems of checkmates we give for the young chess-player to study and endeavour to solve, withholding the explanation of them on purpose.



#### GENERAL OBSERVATIONS.

As we have now treated upon the various laws and rules of Chess to the utmost extent of our limits, we proceed to offer a few hints upon the carrying on a game.

Every move in Chess requiring the utmost circumspection, it is proper to form a slight plan of action ere commencing, and to take care that each piece has its object, and that each move made is a step towards its accomplishment. Protect every piece as much as possible, so that if your opponent manages to gain one, it shall be to his own loss. The least important pieces should be first brought into action; for, by so doing, room is afforded for the chiefs to advance when opportunities occur. If the dignified pieces are brought into requisition at the commencement, they are liable to be attacked by the opposite pawns, and of being either swept off the board, or compelled to retire to disadvantageous situations. Avoid crowding your own men together, so as to prevent your pieces from acting so freely as they should do, but check your adversary's play as soon as you can, by opposing his pieces, when he plays them forwards, with your pawns, so as to crowd his play, and make him lose moves. Before making a move, carefully observe the positions of the men, so as to see, if possible, three or four moves beforehand, and narrowly examine whether any of your pieces are threatened by your antagonist's moves. Have your men always so arranged that you may in an instant correct any defective move, either to remedy it, if unlucky, or support it, if it should chance to prove serviceable.

Never let your queen stand in such a manner before your king, that your opponent, by advancing a rook or a bishop, might put your king in check, as you might lose her without any chance of redemption. If your king is in stalemate, and the game is against you, so that you have only your queen in play, your best plan will be to keep checking your antagonist's king, avoiding doing so when he can employ any of his pieces to make himself stale, as you ultimately compel him to take your queen, and conquer by being stalemate. Always guard, if possible, a piece with one of less value than itself, and take especial care to protect a pawn with a pawn, and not with a superior piece.

Never move a man, or make an attack, unless you can second your attempt by bringing up another piece. Never give check, unless you can gain some point, as by checking needlessly you may lose a move, if your antagonist is able to take your piece, or else be compelled to retire; and perhaps, by such a movement, your adversary's ranks may be opened, so that all his force may be brought against you. If one of your opponent's pieces is unguarded, examine it closely to see whether it is left so purposely, or from accident, for you may lose your game by taking such a stray piece; nay, you may be checkmated even through taking a queen. A far-advanced pawn should be well seconded, as it may be useful in a checkmate, and ultimately make a queen.

When each party, towards the end of a game, has only three or four pawns on the opposite sides of the board, to decide the game it will be necessary to bring the kings into action to gain the move; thus, if you oppose your king to your antagonist's, and there is but one move between them, you gain the move and win the game. Avoid crowding your pieces round your opponent's king, so as to hinder him from making a move, as you may lose the game by making him stalemate. If you find it impossible to guard a point sufficiently, distract your opponent's attention by attacking him in a weak point. Never let an opposing knight, especially if well supported, check your king and queen, or your rook and king, or both your rooks, or your queen and rook, at the same instant, for in the former cases, as the king must necessarily be moved out of check, the queen or the rook must be lost; and, in the two latter cases, a rook must be sacrificed for an inferior piece. If, during a game, you find, upon mature reflection, that you may break your adversary's defence by risking the loss of a few of your own pieces, hazard them cheerfully, and proceed steadily on, sacrificing everything to the end to be attained. But before trying such movements, you must take especial notice of the positions of your adversary's men, and form a decided plan of movement, from which, when once you have formed it, you must not deviate to take any pieces, which may be thrown in your way to mislead you.



## CONCLUSION.

ALTHOUGH we have endeavoured to render this little treatise as explicit and complete as possible, yet we are sensible that some few matters have been too slightly touched upon to afford that explanation which they require; we feel, therefore, that we cannot do better than direct the attention of such of our readers as may wish to be thorough proficient in the noble game of Chess, to study three most interesting works by Mr. Lewis, called "Chess for Beginners," and "First and Second Series of Lessons on Chess," "A New Treatise on the Game of Chess," and "Chess made Easy," by Mr. George Walker, are very excellent; and a little manual called "A New Guide to Chess," contains much information, at a very moderate price.





**BAGATELLE** is played with a table or board, certain kinds of rods, and balls.

A Bagatelle-board is usually about five feet long, and eighteen inches broad; it is lined with green cloth, a slip of thin wood being placed round the outside of its upper end to form a semi-circle. In this board, there are nine cups, sunk level with the cloth; they are numbered 1 to 9, and the game is to drive the balls into these holes with a mace, or cue; each player reckoning towards the game the number of the cup into which he strikes a ball, such numbers being counted by pegs on the edge of each side of the board. The game is a very lively one for a parlour circle; whilst it exercises the sight, and slightly illustrates the impulse of bodies.

Bagatelle may be played by any number of persons; the lead being taken by that person who strikes a ball up the board, and gets the highest number.

The nine balls having been taken by the first player, he places the black or red one on the mark nearest the circle of holes, and one of the white balls on the mark nearest the other end of the board. The player then endeavours with the cue or mace to strike this white ball at the black or red ball, into one of the holes. The other balls are to be similarly struck, either at the outstanding balls, or for the holes; and at the commencement of each round, the coloured ball is to be replaced, as a mark. Each player counts the number of the hole or holes into which he strikes a ball or balls; and he who soonest scores the holes on the edge wins the game. If a ball rebound beyond the centre, or be struck off the board, it must not be used again during that round.

There is another variety of Bagatelle, in which the cups are not used; but, instead of them, an arched board, with holes similarly numbered; and the player counts the number of the hole through which he strikes a ball.

There is likewise a game of "Geographical Bagatelle," in which the balls are struck into portions of a map representing countries, instead of holes.

# AMUSEMENTS

IN



A KNOWLEDGE of the properties of numbers in shortening the labours of an arithmetical question, often enables the young arithmetician to assume a sort of oracular power, and thus contribute to the amusement as well as to the instruction of those around him. We present the young reader with a few specimens of this intellectual entertainment.

## NUMBER 9.

SOME numbers, such as 9 and 3 in particular, have very curious properties. If a figure, with a number of ciphers attached to it, be divided by 9, the quotient will be composed of one figure only, namely, the first figure of the dividend, as—

$$\begin{array}{r} 9)600,000 \\ \hline 66,666-6 \end{array}$$

$$\begin{array}{r} 9)40,000 \\ \hline 4,444-4 \end{array}$$

If any sum of figures can be divided by 9, as—  $\left. \begin{array}{r} 9)549 \\ \hline 61 \end{array} \right\}$

the amount of these figures, when added together, can be divided by 9;—thus, 5, 4, 9, added together, make 18, which is divisible by 9. If the sum 549 is multiplied by any figure, the product can also be divided by 9, as—

$$\left. \begin{array}{r} 549 \\ 6 \\ \hline 9)3294 \\ \hline 366 \end{array} \right\}$$

And the amount of the figures of the product can also be divided by 9;—thus,

$$\left\{ \begin{array}{r} 3 \\ 2 \\ 9 \\ 4 \\ \hline 2)18 \\ \hline 9 \end{array} \right.$$

(304)

To multiply by 9, add a cipher, and deduct the sum that is to be multiplied ;—thus,

$$\left. \begin{array}{r} 43,260 \\ 4,326 \\ \hline 38,934 \end{array} \right\} \text{ Produces the same result as } \left\{ \begin{array}{r} 4,326 \\ 9 \\ \hline 38,934 \end{array} \right.$$

In the same manner, to multiply by 99, add two ciphers ; by 999, three ciphers, &c. These properties of the figure 9 will enable the young arithmetician to perform an amusing trick, quite sufficient to excite the wonder of the uninitiated.

Any series of numbers that can be divided by 9, as 365,472, 821,754, &c., being shown, a person may be requested to multiply secretly either of these series by any figure he pleases, to strike out one number of the quotient, and to let you know the figures which remain, in any order he likes ; you will then, by

$$\begin{array}{r} 365472 \\ 6 \\ \hline 2192832 \end{array} \left. \begin{array}{l} \text{the assistance of the knowledge of} \\ \text{the above properties of 9, easily} \\ \text{declare the number which has been} \\ \text{erased. Thus, suppose 365,472 are} \\ \text{the numbers chosen, and the mul-} \\ \text{tiplier is six ; if, then, 8 is struck out,} \\ \text{the numbers returned to you will be} \end{array} \right\} \begin{array}{r} 2 \\ 1 \\ 9 \\ 2 \\ 3 \\ 2 \\ - \\ 19 \end{array}$$

The amount of these numbers is 19 ; but 19, divided by 9, leaves a remainder of 1 : you, therefore, want 8 to complete another 9. 8, then, is the number erased.

A SIMPLE method of proving the correctness of a sum in mul-

$$\begin{array}{r} 5 \\ 6 \\ 2 \\ 3 \\ 9)16 \\ \hline 1-7 \\ 3 \\ 2 \\ 7 \\ 9)12 \\ \hline 1-3 \\ 7 \\ 3 \\ 9)21 \\ \hline 2-3 \end{array} \begin{array}{l} \text{tiplication is practised by the use of} \\ \text{the 9. Suppose 5,623 is multiplied} \\ \text{by 327 ; to ascertain its correctness,} \\ \text{proceed thus,—add together first 5, 6,} \\ \text{2, 3, and ascertain how many nines} \\ \text{there are in the amount, and note} \\ \text{down the remainder ; this will be 7 :} \\ \text{then add 3, 2, 7, together, and do} \\ \text{the same ; the remainder here will} \\ \text{be 3 : multiply these two figures toge-} \\ \text{ther, divide by 9, and note the re-} \\ \text{mainder ; then add the numbers of} \\ \text{the quotient together, and divide by 9.} \\ \text{If the sum has been correctly done,} \\ \text{the remainder will be the same as the} \\ \text{last, namely, 3 ;—thus,} \end{array} \begin{array}{r} 5623 \\ 327 \\ \hline 39361 \\ 11246 \\ 16869 \\ \hline 1838721 \\ \hline 1 \\ 8 \\ 3 \\ 8 \\ 7 \\ 2 \\ 1 \\ \hline 9)30 \\ \hline 3-3 \end{array}$$

## ODD AND EVEN NUMBERS.

EVERY odd number, multiplied by an odd number, produces an odd number; every odd number, multiplied by an even number, produces an even number; and every even number, multiplied by an even number, produces also an even number. Also, an even number added to an even number, or an odd number added to an odd number, produces an even number; while an odd number and an even number added together produce an odd number.

If any one holds an odd number of counters in one hand, and an even number in the other, it is not difficult to discover in which hand the odd or even number is;—thus, desire the party to multiply the number in the right hand by an even number, and that in the left hand by an odd number, then to add the two sums together, and tell you the last figure of the product; if it is even, the odd number will be in the right hand, and if odd, in the left hand.

## TO FIND THE DIFFERENCE BETWEEN TWO NUMBERS, THE GREATER OF WHICH IS UNKNOWN.

TAKE as many nines as there are figures in the smaller number and subtract from them the amount of the number. Request some one to add the difference to the larger number, to take away the first figure of the total, and add it to the last one, and the sum then produced will be the difference between the two numbers.

For example:—John, who is 22, tells George, who is some years older, that he can find out the difference in their ages; he therefore deducts in his mind 22 from 99, and the difference, 77, he tells George to add to his own age; to take away the first figure from the sum so obtained, and to add it to the last figure; the last amount gained being the difference between their respective ages.

|                                         |       |
|-----------------------------------------|-------|
| Thus, the difference between John's age |       |
| and 99, is                              | 77    |
| To which George adding his age          | 35    |
|                                         | <hr/> |
| produces a total of                     | 112   |

|                                         |       |
|-----------------------------------------|-------|
| From which if we take away the first    |       |
| figure 1, and add it to the last figure |       |
| 2, the product is                       | 13    |
| Which if added to John's age            | 22    |
|                                         | <hr/> |
| exactly gives that of George            | 35    |

THREE COUNTRY-WOMEN AND EGGS.<sup>A</sup>

THREE country-women went to market with eggs: the first had 50 to dispose of, the second 30, and the third no more than 10. All three sold out at the same rate, and each made the same quantity of money of her eggs. How were they sold? Upon coming to market, they found that eggs were selling at seven a penny, at which rate the first woman sold 49, and received sevenpence; the second sold 28, and of course received fourpence; and the third woman sold only a single pennyworth, so that she had three eggs remaining, whilst her companions had but one and two respectively. In the course of the day the demand greatly increasing, she advanced her price to threepence per egg, at which rate she sold the remainder of her stock, and received ninepence for it.

Her companions following her example, sold off theirs also at the same price, so that they each realized the sum of tenpence.

|                                       |          |
|---------------------------------------|----------|
| 1st woman for 49 eggs, received ..... | 7        |
| and for 1 egg .....                   | 3        |
|                                       | <hr/> 10 |
| 2nd woman for 28 eggs .....           | 4        |
| and for 2 eggs .....                  | 6        |
|                                       | <hr/> 10 |
| 3rd woman for 7 eggs .....            | 1        |
| and for 3 .....                       | 9        |
|                                       | <hr/> 10 |

TO MAKE ANY NUMBER DIVISIBLE BY NINE BY ADDING A  
FIGURE TO IT.

SUPPOSE, for example, that the number named is 72,857, desire the person naming it to place the number 7 between any two figures of that sum, and it will be divisible by 9; for if any number is multiplied by nine, then the sum of the figures of the product, will either be nine, or else a number which is divisible by it.

## THE BASKET AND STONES.

IF a hundred stones be placed in a straight line, a yard distant from each other, how many yards must a person walk, who undertakes to pick them up, one by one, and put them into a basket, placed also a yard from the first stone? It is clear that to pick up the first stone and put it into the basket, the person must walk two yards, one in going for the stone, and the other in

returning with it; that for the second stone, he must walk four yards, and so on, increasing by two, as far as the hundredth, when he must, of necessity, walk two hundred yards: so that the sum total will be the product of two hundred and two, multiplied by fifty, or 10,100 yards, which amounts to more than five miles and a half.

THE DIGITAL NUMBERS ARRANGED SO AS TO GIVE THE SAME PRODUCT, WHETHER COUNTED HORIZONTALLY, DIAGONALLY, OR PERPENDICULARLY.

|   |   |   |
|---|---|---|
| 8 | 3 | 4 |
| 1 | 5 | 9 |
| 6 | 7 | 2 |

#### MAGIC SQUARES.

A magic square, is a square figure formed of a series of numbers in mathematical proportion, so arranged in parallel and equal ranks, as that the sums of each row, whether taken perpendicularly, horizontally, or diagonally, are exactly equal.

The several numbers which make any square number, (for instance, 1, 2, 3, 4, 5, &c., to 25 inclusive, which compose the square number 25) being arranged one after the other in a square figure of 25 cells, each one in its cell, if you alter the order of these numbers, and put them in such a manner, that the five numbers, which fill a perpendicular rank of cells being added together, shall make the same number with the five numbers in any other rank, whether horizontal or vertical, or with the five in each of the two diagonal rows, then the square so formed is called a magic square, in opposition to the former arrangement, which is called a natural square.

A NATURAL SQUARE.

|    |    |    |    |    |    |    |    |    |    |  |   |
|----|----|----|----|----|----|----|----|----|----|--|---|
| A  |    | G  |    |    | B  |    |    |    |    |  |   |
| 1  |    | 2  |    | 3  |    | 4  |    | 5  |    |  |   |
| 6  |    | 7  |    | 8  |    | 9  |    | 10 |    |  |   |
| E  | 11 |    | 12 |    | 13 |    | 14 |    | 15 |  | F |
| 16 |    | 17 |    | 18 |    | 19 |    | 20 |    |  |   |
| 21 |    | 22 |    | 23 |    | 24 |    | 25 |    |  |   |
| C  |    | H  |    |    | D  |    |    |    |    |  |   |

A MAGIC SQUARE.

|  |    |    |    |    |    |
|--|----|----|----|----|----|
|  | A  |    |    |    | B  |
|  | 11 | 24 | 7  | 20 | 3  |
|  | 4  | 12 | 25 | 8  | 16 |
|  | 17 | 5  | 13 | 21 | 9  |
|  | 10 | 18 | 1  | 14 | 22 |
|  | 23 | 6  | 19 | 2  | 15 |
|  | C  |    |    |    | D  |

Any five of the sums in the magical square, taken in a right line, will make 65. It will be observed that the five numbers in the diagonals, A D and B C of the magical square, answer to the ranks E to F and G to H in the natural square, and that 13 is the centre number of both squares.

To form a magic square, first transpose the two ranks in the natural square to the diagonals of the magic square; then put the number 1 under the central number 13, and the number 2 in the next diagonal, downwards. The number 3 should be placed in the same diagonal line; but as there is no room in the square, you are to place it in that part it would occupy, were another square placed under it. For the same reason, the number 4, by following the diagonal direction falling out of the square, it is to be put into the part it would hold in another square ranged by the side of this. You next proceed to numbers 5 and 6, still descending; but as the square in which 6 should be put is already filled, you must then go back to the diagonal, and consequently place the 6 in the second place under the 5, so that there may remain an empty square between the two numbers. The same rule is to be observed whenever you find a square already filled.

You proceed in this manner to fill all the empty squares in the angle, where the 15 is put; and as there is no space for the 16 in the same diagonal, descending, you must place it in the part it would hold in another square, and continue the same plan till all the squares are filled. This method will serve for all sorts of arithmetical progressions composed of odd numbers, even numbers being too complicated to afford any amusement.

#### COUNTRY-WOMAN AND EGGS.

A country-woman carrying eggs to a garrison, where she had three guards to pass, sold to the first guard half the number she had, and half an egg more; to the second, the half of what remained, and half an egg besides; and to the third guard, she sold the half of the remainder, and half another egg. When she arrived at the market-place, she had three dozen still to sell; how was this possible, without breaking any of the eggs? It would seem at the first view that this is impossible, for how can half an egg be sold without breaking any of the eggs? The possibility of this seeming impossibility will be evident, when it is considered, that by taking the greater half of an odd number, we take the exact half  $+$   $\frac{1}{2}$ . When the country-woman passed the first guard, she had 295 eggs; by selling to that guard 148, which is the half  $+$   $\frac{1}{2}$ , she had 147 remaining; to the second guard she disposed of 74, which is the major half of 147; and, of course, after selling 37 out of 74 to the last guard, she had still three dozen remaining.



A PERSON HAVING AN EVEN NUMBER OF SHILLINGS IN ONE HAND, AND AN UNEVEN NUMBER IN THE OTHER, TO TELL IN WHICH HAND THE EVEN OR ODD NUMBER IS.

REQUEST the person to multiply the number in his right hand by an odd figure, and the number in his left by an even one, and let you know whether, when the products are added together, they produce an odd or even sum. If odd, then the even number is in the left hand; and if even, the even number is in the right. As for instance:—

|                              |                                         |          |
|------------------------------|-----------------------------------------|----------|
| The number in the right hand | In the left hand, <i>even</i> . . . . . | 18       |
| being <i>odd</i> . . . . .   | Multiply it by . . . . .                | 2        |
| Multiply it by . . . . .     |                                         | <hr/> 3  |
|                              | Product, 36                             |          |
|                              | Product, 21                             |          |
| Add the product of the left  |                                         |          |
| hand . . . . .               |                                         | <hr/> 36 |
| and the total is . . . . .   |                                         | <hr/> 57 |

|                              |                                        |          |
|------------------------------|----------------------------------------|----------|
| The number in the right hand | In the left hand, <i>odd</i> . . . . . | 7        |
| being <i>even</i> . . . . .  | Multiply it by . . . . .               | 2        |
| Multiply it by . . . . .     |                                        | <hr/> 3  |
|                              | Product, 14                            |          |
|                              | Product, 54                            |          |
| Add the product of the left  |                                        |          |
| hand . . . . .               |                                        | <hr/> 14 |
| and the total is . . . . .   |                                        | <hr/> 68 |

#### TO TELL THE NUMBER THOUGHT OF BY A PERSON.

REQUEST a person to think of a number, and when he has done so, to triple it, and to take the exact half of the triple, if it be even, or the greater half, if it be odd. Next, desire him to triple that half, and ask him how many times it will contain nine, for the number thought of will be the double of the number of nines, and one more, if it be odd. Thus, suppose that 5 is the number thought of, its triple is 15, which cannot be divided by two, without a remainder. The greater half of 15 is 8, and if this is multiplied by 3, we shall have 24, which contains two nines; the number thought of will therefore be twice the number of nines, with one added, as before mentioned, for an uneven number, or  $4 + 1$ , that is 5.

ANOTHER METHOD. When the person has thought of a number, tell him to double it, then to add four to it, to multiply the whole

by five, and to the product, add twelve, and afterwards multiply the total by 10. From the sum thus produced, bid him deduct 320, and inform you what is the remainder, which if you take away the two last figures from it, will give you the number he thought of. Thus:

|                                                                                         |      |
|-----------------------------------------------------------------------------------------|------|
| Suppose the number selected is .....                                                    | 7    |
| The double of that is .....                                                             | 14   |
| Which with the addition of 4 is .....                                                   | 18   |
| And that multiplied by 5 is .....                                                       | 90   |
| To which 12 added produces .....                                                        | 102  |
| Which multiplied by 10 is .....                                                         | 1020 |
| From which, by deducting 320, there remains ...                                         | 700  |
| And which, by taking away the two ciphers,<br>is reduced to the number thought of ..... | 7    |

#### TO TELL TWO OR MORE NUMBERS WHICH A PERSON HAS THOUGHT OF.

If either of the numbers thought of do not exceed nine, they may be found as follows: make the person add 1 to the double of the first number thought of, and then request him to multiply the whole by 5, and then add to the product the second number. Should there be a third number, make him double the first sum, and add 1 to it; request him then to multiply the whole by 5, and to add the third number to it. If there is a fourth number, you, of course, proceed in the same way, requesting him to double the preceding sum; to add 1 to it, then to multiply it by 5, and thereto add the fourth number, and so on. You must next ask the number arising from the addition of the last number thought of, and if there were two numbers, subtract 5 from it; if three, 55; and if four, 555, and so on; for the remainder will always be composed of figures, of which the first on the left hand is the first number thought of, the next the second, and so on of the rest. Suppose, for instance, the numbers thought of, are 3, 4, 6, by adding 1 to 6, which is the double of the first number, we have 7, which being multiplied by 5, gives 35; if 4, the second number thought of is then added, we shall have 39, which doubled, gives 78, and if we add one, and multiply 79 by 5, the result will be 395. Finally, if we add 6, the third number thought of, the sum total will be 401, and if we deduct 55 from it, we shall have for the remainder 346; the figures of which, 3, 4, 6, are the three numbers thought of in their correct order.

#### A PERSON STRIKING A FIGURE OUT OF THE SUM OF TWO GIVEN NUMBERS, TO TELL WHAT THAT FIGURE WAS.

**PEREMPTORILY** command such numbers only as are divisible by 11, for instance, 36, 63, 117, 126, 162, &c. Then allow a person

to choose any two of these numbers; and after adding them together, in his mind, to strike out from the total, any one of the figures he pleases. When he has done this, desire him to tell you the sum of the figures, and it follows, that the number you are obliged to add to this amount, in order to make it 9 or 18, is the one he struck out. For example, he chooses the numbers 126 and 252, whose aggregate sum is 378. Then if he strikes out the 7 from this amount, the remaining figures, 3 and 8, will make 11, to which must be added 7 to make 18; but if he strikes out the 3, the sum of the remaining figures, 7 and 8, will be fifteen, add to which 3, to make 18; and so, in like manner, for the 8.

#### THE HORSE-DEALER'S BARGAIN.

A horse-dealer, wishing to dispose of a horse at as high a price as he could, induced a gentleman who admired it, to become the purchaser, by offering to let him have the animal for the value of the twenty-fourth nail in his shoes, reckoning one farthing for the first nail, two for the second, four for the third, and so on, to the twenty-fourth. The gentleman, thinking it a bargain, gladly accepted the offer; the value of the horse was, therefore, necessarily great.—By calculation, the twenty-fourth term of the progression, 1, 2, 4, 8, &c., will be found to be 8,388,608, equal to the number of farthings the purchaser gave for the horse; the price consequently amounted to £8,738 2s. 8d.

#### TO FIND THE LEAST NUMBER OF WEIGHTS WHICH WILL WEIGH ANY INTERMEDIATE WEIGHT, FROM ONE POUND TO FORTY, EXCLUSIVE OF FRACTIONS.

This problem may be solved through the means of the geometrical progression, 1, 3, 9, 27, &c., the peculiar property of which is, that the last number is twice the sum of all the rest, and one more; so that, the number of pounds being 40, which is likewise the amount of 1, 3, 9, 27, these four weights will answer the purpose. For example, if it be necessary to weigh eleven pounds by these weights, the three and the nine pound weights must be put into the one scale, and the one pound weight into the other, therefore, any substance put into this last scale, with the one pound weight, and it remains in equipoise with the other scale, it must consequently weigh eleven pounds. Again, if a weight of fourteen pounds is required, the one, the three, and the nine pounds weights should be put into one of the scales, and the twenty-seven pounds weight into the other, which will then outweigh the first scale by the exact number needed. Any other weights may be made by similar combinations.

THE FIGURES, UP TO 100, ARRANGED SO AS TO MAKE 505 IN EACH COLUMN, WHEN COUNTED IN TEN COLUMNS PERPENDICULARLY, AND THE SAME WHEN COUNTED IN TEN FILES HORIZONTALLY.

|     |    |    |    |    |    |    |    |    |     |
|-----|----|----|----|----|----|----|----|----|-----|
| 10  | 92 | 93 | 7  | 5  | 96 | 4  | 98 | 99 | 100 |
| 11  | 19 | 18 | 84 | 85 | 86 | 87 | 13 | 12 | 90  |
| 71  | 29 | 28 | 77 | 76 | 75 | 24 | 23 | 22 | 80  |
| 70  | 62 | 63 | 37 | 36 | 35 | 34 | 68 | 69 | 31  |
| 41  | 52 | 53 | 44 | 46 | 45 | 47 | 58 | 59 | 60  |
| 51  | 42 | 43 | 54 | 56 | 55 | 57 | 48 | 49 | 50  |
| 40  | 32 | 33 | 67 | 65 | 66 | 64 | 38 | 39 | 61  |
| 30  | 79 | 78 | 27 | 26 | 25 | 74 | 73 | 72 | 21  |
| 81  | 89 | 88 | 14 | 15 | 16 | 17 | 83 | 82 | 20  |
| 100 | 9  | 8  | 94 | 95 | 6  | 97 | 3  | 2  | 91  |

Each of these files, when added up, makes 505.

Each of these ten columns, when added up, makes 505.

TO FIND HOW MANY SQUARE YARDS IT WOULD REQUIRE TO CONTAIN IN WRITING ALL THE CHANGES OF THE ALPHABET, EACH LETTER WRITTEN SO SMALL AS NOT TO OCCUPY MORE THAN THE HUNDREDTH PART OF A SQUARE INCH.

By multiplying the numbers from 1 to 24, continually into each other, thus:—

$$\begin{array}{r}
 1 \\
 2 \\
 \hline
 2 \\
 3 \\
 \hline
 6 \\
 4 \\
 \hline
 24 \\
 \hline
 \end{array}$$

the changes of the twenty-four letters will be found to be,—

62,044,840,175,323,943,936,000.

Now, as there are 1296 inches in a square yard, if we multiply that number by 100, we shall obtain 129,600, which is the number of letters each square yard will contain; if we afterwards divide the above row of figures,—the number of changes,—by the 129,600, the quotient, which will be 478,741,050,720,092,160, is the number of yards required to contain the before stated number of changes. But, as all the twenty-four letters are contained in

every permutation, the space must necessarily be twenty-four times as large, viz.—

11,849,785,210,282,211,840

As the surface of the whole earth contains but 617,197,435,008,000 square yards, it would consequently require, to make a space of sufficient dimensions to contain all the changes of which the alphabet is susceptible, a surface 18,620 times larger than that of the globe.

#### THE NUMBER FORTY-FIVE.

How can the number 45 be divided into four such parts, that if you add two to the first part, subtract two from the second part, multiply the third part by two, and divide the fourth part by two, the total of the addition, the remainder of the subtraction, the product of the multiplication, and the quotient of the division, are all equal? The four parts are as follows:

- The first is 8, to which 2 being added, makes . . . . . 10
- The second is 12, from which 2 being subtracted, leaves 10
- The third is 5, which, being multiplied by 2, produces . . 10
- The fourth is 20, which, divided by 2, the quotient is . . . 10

#### PROFIT AND LOSS.

A man purchased ninety-six apples at the rate of three a penny, and likewise the same number at two a penny; he sold them again at five for two pence: did he gain or lose? He lost: for, as the ninety-six apples at three a penny cost him 2s. 8d., and the ninety-six at two a penny, 4s., the sum he laid out was 6s. 8d. for the one hundred and ninety-two apples. Now, after he sold thirty-eight, two pennyworths, for which he received 6s 4d., he had but two apples remaining, and therefore he lost a fraction above 3½d.

#### THE PHILOSOPHER'S, PUPILS.

Tell illustrious Pythagoras, how many pupils receive instruction from thy lips? Nay, said the philosopher, compute the number thyself; one-half of my pupils study mathematics, one-fourth natural philosophy, one-seventh observe silence, and besides those, I have three female pupils. The question is to find out a number, the one-half, one-fourth, and one-seventh of which, + 3, shall be equal to that number. The number required is 28.

## LEGERDEMAIN.



THE BALANCED EGG. PAGE 319

Doubtless the pleasure is as great  
Of being cheated as to cheat ;  
As lookers-on feel most delight,  
That least perceive a juggler's sleight,  
And still the less they understand,  
The more they admire his sleight of hand.

HUDIBRAS.

As the multifarious performances of the

" Nimble jugglers, that deceive the eye,"

have in all ages been especial favourites of the people, we cannot do better than prelude our tricks of **LEGERDEMAIN AND SIMPLE DECEPTIONS**, with a brief notice of the early history of the deceptive art.

The origin of Legerdemain is lost in its great antiquity, for it would be an utterly hopeless task to endeavour to find out what precise period men began to deceive their fellow-men by sleights of hand, and other specious trickery. Amongst the early Egyptians, some tricks were practised similar to what are displayed in the present day, such as casting up knives and balls alternately, and the cheating trick known by the name of the "thimble-rig." Sleight of hand tricks, fire eating, balancing poles upon the forehead, learned pig, taking up red hot iron, with tumbling, and

(315)

many other exploits of the same kind, are of classical antiquity; and it would seem, from the accounts still remaining, that the ancient jugglers were no mean proficient in the art they professed.

During the Anglo-Saxon period of English history, Gleemen or Harpers practised legerdemain and other deceptions; and their merry tricks made them especial favourites, not only with the poorer classes, but in the halls of the great, and in the royal courts. They not only singly displayed their tricks, but often associated themselves in companies, so as to add to the interest and complexity of their feats and shows, by the aid of skilful confederacy. They also taught animals to perform various whimsical evolutions, and to tumble.

Soon after the Conquest, the Gleemen lost their Saxon appellation, and were called *Ministralx*, or *Minstrels*, and their art was divided into several branches, one of which included all such men as practised sleights of hand, tumbling, balancing, grotesque dancing, and teaching horses, bears, dogs, and monkeys to dance; they were called *Joculators*, *Jongleurs*, or *Jugglers*. In the fourteenth century, the Jugglers appear to have been separated from the musical poets or true minstrels; and they were at that time frequently termed *tregetours*, or *tragetours*; an appellation supposed to have been bestowed upon them, from their making use of a trebuchet, or trap-door, when shewing their tricks upon a scaffold or stage. In addition to the various feats we have mentioned, as being performed by these men, there are others described by old authors, which shew that they employed machinery of various kinds, to produce magical appearances, or effects of enchantment; and if we may rely upon the accounts of their skill, they must certainly have been most admirable deceivers. Indeed, they were often ranked with "witches, sorcerers, and magicians;" and if we reflect upon the startling appearances which can be produced by means of such an instrument as the magic lantern, aided by a skilful confederate, and well-arranged place in which the scenes are displayed, we shall cease to wonder that multitudes of the people who were ignorant, not of natural philosophy only, but of the simplest rudiments of learning, should have considered that some other than mere human skill must be engaged in producing such astonishing effects.

In the fourteenth century, the Jugglers appear to have been in their greatest popularity, but, by degrees, they lost the protection of the wealthy, and fell in the estimation of the people; and, in the time of Queen Elizabeth, they were in so great disrepute, as to be classed by the moral writers of the time amongst "ruffians, blasphemers, thieves, and vagabonds;" nay, they were even included in a vagrant act, passed in the thirty-ninth year of this Queen's reign, and subjected to the same punishments as rogues and sturdy beggars.

In the seventeenth century, juggling was, though shorn of its splendour, still exhibited with effect at country and town fairs and merrymakings ; and that compound of cheat and juggler, the mountebank, or quack-doctor, blended sleights of hand with his professional avocations. At the present time, the Jugglers, instead of feasting and revelling in the houses of the nobility, travel from town to town, to pick up a precarious subsistence, by displaying their feats in public houses, or before miscellaneous crowds in open streets.

Such is a brief sketch of the history of the early professors of the ART OF MAGIC.

THERE is probably, no amusement which excites more astonishment and interest in a youthful circle, than a series of adroitly performed and humorous tricks of legerdemain, certainly none more harmless ; and that we may add our quota to the sports for a winter's night, we have carefully made a selection of such tricks, as while they tend to promote

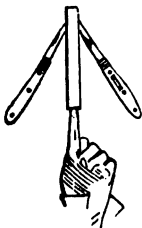
“ Jest and youthful jollity,”

possess but little difficulty of execution, or require no great quantity of apparatus.

#### WATER IN A SLING.

HALF fill a mug with water, place it in a sling, and you may whirl it around you without spilling a drop ; for the water tends more away from the centre of motion towards the bottom of the mug, than towards the earth by gravity.

#### THE BALANCED STICK.



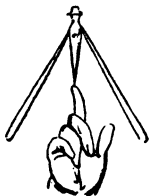
GET a piece of wood six inches in length, and about half an inch in thickness ; and, near one end of it, thrust in the blades of two penknives, in such a manner, that one of them incline to one side, and the second to the other, as delineated in the illustration. Place the other end of the piece of wood on the tip of the forefinger, when it will remain perfectly upright, without falling ; and even if it incline to one side, it will instantly recover its perpendicular position, being, in reality, kept in equipoise by the weight of the knives.

#### THE LITTLE BALANCER.

A LITTLE figure may be made on the principles of the foregoing trick, so as to balance itself very amusingly. Get a



piece of wood about two inches in length, cut one end of it into the form of a man's head and shoulders, and let the other end taper off gradually to a fine point, as shown in the annexed figure. Next, furnish the little man with wafers, shaped like oars, instead of arms, which wafers may be somewhat more than double the length of his body; insert them in his shoulders, and he will be complete. When you place him on the tip of your finger, if you have taken care to make the point exactly in a line with the centre of his body, and have put the wafers accurately in their places, he will preserve his balance, even if blown about; provided he be not blown with so much force as to drive him off his perch. This little man will cause more surprise than the previous trick, in consequence of the fine point on which he oscillates.



#### EATABLE CANDLE ENDS.

THE best time for exhibiting this trick is while the dessert is on table, and the company are engaged in conversation. Cut a piece out of a large apple as neatly as possible, into the shape of a candle-end: next cut a slip out of the inside of a sweet almond, and make it nicely round and even, to imitate the wick of a wax candle; insert the wick into the apple-candle, light it for a moment to blacken the tip, and to render the illusion more perfect, blow it out again, and the candle will be complete. When showing the trick, light the candle, (the wick of which will readily take fire, put it into your mouth, masticate and swallow it with all the seeming relish you can possibly assume.

#### THE ANIMATED SIXPENCE.

If you pierce a very small hole in the rim of a sixpence, and pass a long black horse hair through it, you may make it jump about mysteriously, and even out of a jug. It is necessary, however, to perform this trick only at night time; and to favour the deception as much as possible, a candle should be between the spectator and yourself.

#### THE TRAVELLING EGG.

PROCURE a goose's egg, and after opening and cleaning it, put a bat into the shell, and then glue a piece of white paper fast over the aperture. The motions of the poor little prisoner in struggling to get free, will cause the egg to roll about in a manner that will excite much astonishment.

## THE BALANCED EGG.

LAY a looking-glass face upward, on a perfectly even table; then shake a fresh egg, so as to mix up and incorporate the yolk and the white thoroughly; with care and steadiness you may then balance the egg on its point, and make it stand upright on the glass, which it will be impossible to achieve when the egg is in its natural state.

## TO MELT LEAD IN A PIECE OF PAPER.

WRAP a piece of paper very neatly round a bullet, so that it be everywhere in contact with the lead; hold it over the flame of a candle, and the lead will be melted without the paper being burnt; but when once fused, the lead will in a short time pierce a hole in the paper, and drop through it.

## THE DANCING PEA.

TAKE a piece of a tobacco-pipe of about three inches in length, one end of which, at least, is broken off even; and with a knife or file make the hole somewhat larger, so as in fact to form a little hollow cup. Next, get a very round pea, put it in the hollow at the end of the bit of pipe, place the other end of the latter in your mouth, hold it there quite in a perpendicular position, by inclining your head back, and then blow through it very softly; the pea will be lifted from its cup, and rise and fall according to the degree of force with which the breath is impelled through the pipe.

## TO MAKE A SHILLING TURN ON ITS EDGE ON THE POINT OF A NEEDLE.



PROVIDE a wine-bottle, and insert in the neck of it a cork, in which next place a needle in a perpendicular position. Cut a nick in the bottom of another cork, and fix a shilling in it; and into the same cork stick two common table-forks, opposite to each other, with the handle inclining downward, as in the annexed engraving. If the rim of the shilling be then placed upon the point of the needle, it may be turned round without any risk of falling off, as the centre of gravity is below the centre of suspension.

## MAGICAL CARDS.

To perform this experiment, you must observe that there are many letters which may be transposed into others, without the alteration being very apparent; for instance, *a* may be turned



the bucket, at the bottom ; its middle, F, resting on the opposite top edge of the bucket, and its other extremity, E, against the first stick, C, D, in which a notch must be cut to retain it. The bucket will be thus kept in its situation, without inclining to either side ; and if not already full of water, may be filled with safety.

**TO TURN A GOBLET OF WATER UPSIDE DOWN, AND YET  
KEEP THE WATER IN IT.**



THIS is an exceedingly good trick, when performed adroitly. Fill a goblet with water, lay a piece of paper on the top of it, place the palm of your left hand flat on the paper, and press it closely down ; then take hold of the foot of the goblet with the right hand, and invert the position of the glass, still pressing the paper close with the left hand. Hold it in this manner for a minute

or two, and then withdraw the left hand, when the paper will remain attached to the glass, as shewn in the illustration ; for the pressure of air underneath, acting against the paper with a superior weight to that of the water, is sufficient to retain it in its position, and consequently sustain the water in the goblet.

**TO TAKE A SHILLING OUT OF A HANDKERCHIEF.**

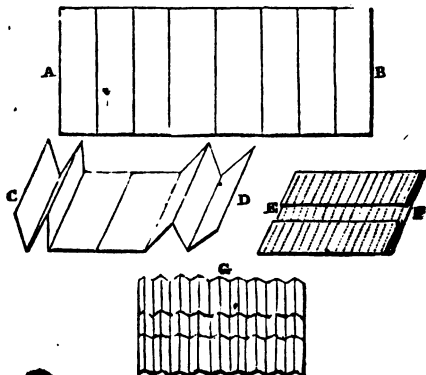
FOR this trick you must procure a curtain-ring of exactly the size of a shilling. At first, put the shilling into the handkerchief ; but when you take it out, to show that there is no deception, slip the ring in its stead, and while the person is eagerly holding the handkerchief, and the company's eyes are fixed upon the form of the shilling, seize the opportunity of putting it away secretly. When the handkerchief is returned to you again, cautiously withdraw the curtain-ring, and show the shilling.

**A GOOD CATCH.**

THE following is a good catch : lay a wager with a person that to three observations you will put to him, he will not reply "a bottle of wine." Then begin with some common-place remark, such as, "We have had a fine, or wet, day to-day," as it may be ; he will answer, of course, "a bottle of wine." You then make another remark of the same kind, as, "I hope we shall have as fine or finer to-morrow," to which he will reply, as before, "a bottle of wine." You must then catch him very

sharply, and say, "Ah! there, sir! you've lost your wager;" and the probability is, if he be not aware of the trick, he will say "Why, how can you make that out?" or something similar, forgetting that, though a strange one, it is the third observation you have made.

## TROUBLE-WIT.

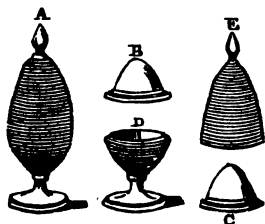


To make this exceedingly entertaining and ingenious puzzle, take a very large sheet of paper, either demy or cartridge, and divide it into eight parts, as shown in the piece A, B, in the above illustration; taking especial care to make the fourth and fifth divisions, (which are the two centre divisions of the sheet,) much wider than the others. In the illustration, the paper is shown as if it were only a half sheet, but it must be a whole sheet. Then plait the sheet as indicated in the piece C, D, and arrange the folds one over the other, as shown at E, F. Next, fold a series of small plaits, about a quarter of an inch in depth, across the paper, as delineated by the dotted lines across E, F, and it will appear as in the figure G.

Very numerous figures may be imitated by drawing out the paper and opening the folds, which are one upon the other; and amongst them, the following:—A winding staircase, an oval table, a parasol, a Spanish hat, a Spanish ruff, a fan, a scraper to

scrape a chimney with, a salt-cellar, a dark lantern, &c. By exercising the ingenuity, TROUBLE-WIT may be turned into an infinity of figures, and be a source of great amusement.

## THE EGG-BOX.

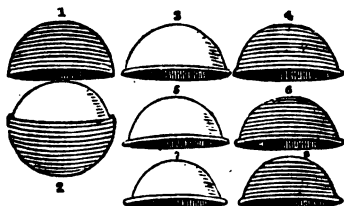


THE egg-box is made in the shape of two bee-hives put together, as shown at A. B, an inner case, or box, is covered with half the shell of a real egg; another shell, C, is of the egg shape, but rather larger than the other; and E is the cover, or upper part of box, D. Put E upon C, and both upon B, and then all three upon D; when done, the box is ready for showing the trick. Then, call for an egg, and request the spectators to examine it, and see that it is a real one. Next, take off the upper parts, E, B, and C, with your forefinger and thumb; place the egg in the box, and say, "Ladies and gentlemen, you all see that it is fairly in the box;" uncover it, and say, "You shall see me as fairly take it out;" suiting the action to the word, putting the egg into your pocket in their sight. Next, open your box again, saying, "You perceive that there is nothing in it;" place your hand about the middle of the box, and take C off, without B, and say, "There is the egg again;" it will appear to the spectators to be the identical one which you put in your pocket; and then, putting C on, and taking it, together with the inner shell B, off, exclaim, "It has vanished again;" which will really appear to be the case.

## THE JUGGLER'S JOKE.

TAKE a little ball in each hand, and stretch your hands as far apart as you possibly can, one from the other; then tell the company that you will make both the balls come into whichever hand they please, without bringing the hands into contact with each other. If any of the lookers-on challenge your ability of achieving this feat, all you have to do is to lay one of the balls down upon a table, turn yourself round, and take it up with your other hand. Both the balls will thus be in one of your hands, without the latter approaching the other, agreeably to your promise.

## THE GLOBE-BOX.



THIS trick is a very excellent one. It is performed with a box made of eight pieces, and a ball of ivory or wood. The ball serves to deceive the spectators, and the trick should be prefaced by throwing it down upon the table, for the company to examine, and

see that it is perfectly solid. Then put the ball in the box, and close it up, with all the pieces one within the other; take off the upper shell with your forefinger and thumb, and there will appear a ball in the box, but of a different colour to that which was put in. The globe-like form thus displayed looks like a real ball, but in reality it is no more than a very thin shell of wood, neatly turned to that shape, and painted; and the other changes are produced in the same way, as may be perceived by reference to the illustration. No. 1 is the outer upper shell of the box, taken off of the outer under shell No. 2, the top of which represents an inner globe; 3 is an inner globe; 4, its cover: 5, another inner globe; and 6, its cover: 7 is a third globe; and 8, its cover. These globe boxes may be made with as many changes, and as varied in colours, as the performer pleases.

## THE THREE SPOONS.

THIS is a most capital trick, but it requires a confederate's aid. Place three silver spoons crosswise on a table, request any person to touch one, and assure him you will find out the one he touches by a single inspection; although you will leave the room while he does so, and even if he touches it so gently as not to disarrange the order in which they are once put in the slightest degree. You retire; and when he gives you notice to enter, walk up to the table and inspect the spoons, as if trying to ascertain whether there are any finger-marks upon them, and then decide. Your confederate, of course, makes some sign, previously agreed upon, to give you notice which is the identical spoon; the actions may be, touching a button of his jacket for the top spoon, touching his chin for the second, and putting his finger to his lips may signify the lowest; but the precise actions are immaterial, so that the spoon they indicate be understood.

## TO LIFT A BOTTLE WITH A STRAW.

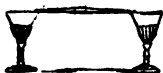


TAKE a stout, unbroken straw, bend the thickest end of it into an acute angle, and put it into a bottle, so that its bent part may rest against the side of the bottle, as in the annexed figure; then take hold of the other end of it, and if you have managed the trick properly, you will be able to lift up the bottle without breaking the straw; and the nearer the angular part of the latter comes to that which passes out of the neck of the former, so much the more easy of accomplishment will be the experiment.

## LOUD WHISPER.

APARTMENTS of a circular or elliptical form are best calculated for the exhibition of this phenomenon. If a person stand near the wall, with his face turned to it, and whisper a few words, they may be more distinctly heard at nearly the opposite side of the apartment than if the listener were situated nearer to the speaker.

## TO BREAK A STICK PLACED ON TWO GLASSES.



THE stick used for this trick must not be very stout, both of its extremities should be tapered off to a point, and they should be as uniform as possible in length, in order that its centre may be easily known. The ends of the stick must be rested on the edges of the glasses, which, of course, should be perfectly even in height, that the stick may lie in a horizontal position without any undue inclination, either to one side or the other; and if a smart quick blow be then struck upon its centre, proportioned (as near as can be guessed) to its size, and the distance the glasses are from each other, it will be broken in two without its supporters being injured.

## THE BOTTLE CONJURER.

You must preface this trick by declaring to the company that it was formerly supposed to be impossible to set the Thames on fire; and that it was demonstrated some years ago, at the Hay-market theatre, that for a person to crawl into a quart bottle was an utter impossibility, but the progress since made in all kinds of knowledge has proved it is possible to set the Thames on fire, and that any one may crawl in to a pint bottle. This statement will, of course, be doubted; but to prove your assertion, get a pint bottle, and place it in the middle of the room; then slip



outside the door, and in a minute or two return, creeping upon all-fours, saying: "Ladies and gentlemen, this is crawling in to the pint bottle!"

#### THE MYSTERIOUS WAFERS.

In the presence of the company, place on each side of a table-knife three wafers; take the knife by the handle, and turn it over several times, to show that the wafers are all on. Request one of the party to take a wafer from one side of the blade, turn the knife over two or three times, and there will seem to be only two wafers on each side; take off another wafer, turn the knife as before, and it will appear as if only one wafer were on each side; take the third wafer off, and again turn the knife dexterously twice or thrice, and it will appear as if all the wafers had disappeared from each side. Next, turn the knife once or twice more, and three wafers will appear on each side, as at the first. In performing this trick, use wafers all of one size and colour, and always have one side of the knife uppermost, so that the wafers may be taken one by one from that side; three wafers will thus be left untouched on the other side; and after you have made it appear that there are no wafers on either side, you may, to all appearance, show three on each. When turning the knife, you must, as you lift it up, turn it completely round with your finger and thumb, so as always to bring the same side uppermost.

#### ADVANTAGEOUS WAGER.

Request a lady to lend you a watch. Examine it, and give a guess as to its value; then offer to lay the owner a wager, considerably below the real value of the watch, that she will not answer to three questions which you will put to her consecutively, "My watch." Show her the watch, and say, "What is this which I hold in my hand?" she, of course, will not fail to reply, "My watch." Next, present to her notice some other object, repeating the same question. If she name the object you present, she loses the wager; but if she be on her guard, and remembering her stake, she says, "My watch," she must, of course, win; and you, therefore, to divert her attention, should observe to her, "You are certain to win the stake, but supposing I lose, what will you give me?" and if, confident of success, she replies for the third time, "My watch," then take it, and leave her the wager agreed on.

#### THE SMOKE-SNAKE.

To construct this pretty little toy, take a square piece of stiff card, or sheet copper or brass, about two-and-a-half or three

inches in diameter, and cut it out spirally, so as to resemble a snake, as in the engraving.



Then paint the body on each side of the card the colours of a snake; take it by the two ends, and draw out the spiral till the distance from head to tail be six or seven inches, as in the figure. Next, provide a slender piece of wood on a stand, and fix a sharp needle at its summit; push the rod up through the spiral, and let the end of the spiral rest upon the summit of the needle. Now place the apparatus as nearly as possible to the edge of the mantle-shelf above the fire, and the snake will begin to revolve in the direction of its head; and if the fire be strong, or the current of heated air which ascends from it be made powerful, by two or three persons coming near it, so as to concentrate the current, the snake will revolve very rapidly. The rod

should be painted so as to resemble a tree, which the snake will appear to climb; or the snake may be suspended by a thread from the ceiling, over the current of air from a lamp. Two snakes may be made to turn round in opposite directions, by merely drawing out the spiral of one from the upper side, and of the other from the under side of the figure; and fixing them, of course, on separate rods.

#### THE RING AND THE HANDKERCHIEF.

This may be justly considered one of the most surprising deceptions; and yet it is so easy of performance, that any one may accomplish it after a few minutes' practice.

Previously provide yourself with a piece of brass wire, pointed at both ends, and bent round so as to form a ring, about the size of a wedding-ring. This conceal in your hand. Then commence your performance by borrowing a silk pocket handkerchief from a gentleman, and a wedding-ring from a lady; and request one person to hold two of the corners of the handkerchief, and another to hold the other two, and to keep them at full stretch. Next exhibit the wedding-ring to the company, and announce that you will make it pass through the handkerchief. Then place your hand under the handkerchief, and substituting the false ring, which you had previously concealed, press it against

the centre of the handkerchief, and desire a third person to take hold of the ring through the handkerchief, and to close his finger and thumb through the hollow of the ring. The handkerchief is held in this manner for the purpose of showing that the ring has not been placed within a fold. Now desire the person holding the corners of the handkerchief to let them drop; the person holding the ring (through the handkerchief as already described) still retaining his hold.

Let another person now grasp the handkerchief as tight as he pleases, three or four inches below the ring, and tell the person holding the ring to let it go, when it will be quite evident to the company that the ring is secure within the centre of the handkerchief. Then tell the person who grasps the handkerchief to hold a hat over it; and passing your hand underneath, open the false ring, by bending one of its points a little aside, and bringing one point gently through the handkerchief, so as easily to draw out the remainder; being careful to rub the hole you have made in the handkerchief with your finger and thumb to conceal the fracture.

Then put the wedding-ring you borrowed over the outside of the middle of the handkerchief, and desiring the person who holds the hat to take it away, exhibit the ring (placed as described) to the company; taking an opportunity, while their attention is engaged, to conceal or get rid of the brass ring.

#### TO CAUSE WINE AND WATER TO CHANGE PLACES.

FILL a small narrow-necked bulb with port wine, or with water and coloured spirit of wine, and put the bulb into a tall, narrow glass jar, which is then to be filled up with cold water: immediately, the coloured fluid will issue from the bulb, and accumulate on the surface of the water in the jar, while colourless water will be seen accumulating at the bottom of the bulb. By close inspection, the descending current of the water may also be observed, and the coloured and the colourless liquids be seen to pass each other in the narrow neck of the bulb without mixing. The whole of the coloured fluid will shortly have ascended, and the bulb will be entirely filled with clear water.

#### THE MAGIC CIRCLE.

ASSURE the company that it is in your power, if any person will place himself in the middle of the room, to make a circle round him, out of which, although his limbs shall be quite at liberty, it will be impossible for him to jump without partially undressing himself, let him use as much exertion as he may. This statement will, without doubt, cause some little surprise; and one of the party will, in all probability, put your asseverations to the test.

Request him to take his stand in the middle of the room, then blindfold him, button his coat, and next with a piece of chalk draw a circle round his waist. On withdrawing the bandage from his eyes and showing him the circle you have described, he must at once perceive that he cannot jump out of it without taking off his coat.

#### THE GLASS OF WINE UNDER THE HAT.

Place a glass of wine upon a table, put a hat over it, and offer to lay a wager with any of the company that you will empty the glass without lifting the hat. When your proposition is accepted, desire the company not to touch the hat; and then get under the table, and commence making a sucking noise, smacking your lips at intervals, as though you were swallowing the wine with infinite satisfaction to yourself. After a minute or two, come from under the table, and address the person who took your wager with, "Now, sir." His curiosity being, of course, excited he will lift up the hat, in order to see whether you have really performed what you promised; and the instant he does so, take up the glass, and after having swallowed its contents, say, "You have lost, sir, for you see I have drunk the wine without raising up the hat."

#### THE MIRACULOUS APPLE.

To divide an apple into several parts, without breaking the rind:—Pass a needle and thread under the rind of the apple, which is easily done by putting the needle in again at the same hole it came out of; and so passing on till you have gone round the apple. Then take both ends of the thread in your hands and draw it out, by which means the apple will be divided into two parts. In the same manner, you may divide it into as many parts as you please, and yet the rind will remain entire. Present the apple to any one to peel, and it will immediately fall to pieces.

#### AN OMELET COOKED IN A HAT, OVER THE FLAME OF A CANDLE.

State that you are about to cook an omelet; then you break four eggs in a hat, place the hat for a short time over the flame of a candle, and shortly after produce an omelet, completely cooked, and quite hot.

Some persons will be credulous enough to believe that by the help of certain ingredients you have been enabled to cook the omelet without fire; but the secret of the trick is, that the omelet had been previously cooked and placed in the hat, but could not be seen, because the operator, when breaking the eggs, placed it too high for the spectators to observe the contents. The eggs were empty ones, the contents having been previously extracted, by being sucked through a small aperture; but to prevent the company from suspecting this, the operator should, as if by accident, let a full egg fall on the table, which breaking, induces a belief that the others are also full.

## THE IMPOSSIBLE OMELET.

PRODUCE some butter, eggs, and other ingredients for making an omelet, together with a frying-pan, in a room where there is a fire, and offer to bet a wager, that the cleverest cook will not be able to make an omelet with them. The wager is won by having previously caused the eggs to be boiled very hard.

## NEW PERPETUAL ROTATORY MOTION.

By an accidental occurrence, it has recently been discovered that a piece of rock-crystal, or quartz, cut in a peculiar form, produces, upon an inclined plane, and without any apparent impetus, an extraordinary rotatory motion, which may be kept up for an indefinite period of time. The curiosity of this philosophical toy having excited general interest in the scientific world, Professor Leslie, in his lecture, thus explains the phenomenon :

"The crystal has six sides, and being cut accurately from the faces to a perfect convex surface, if placed upon a wetted smooth surface, and held parallel, no motion will take place, because the centre of gravity of each face is balanced and supported in this position of the plain surface ; but if a slight inclination is given to the plane, a rotatory motion commences, in consequence of the support being removed from the centre of gravity. The impetus once given, the centrifugal force increases the rotatory motion to such a degree, as for an observer to be unable to distinguish the form of the crystal.

"*To produce the effect.*—Place the crystal on a piece of plate or common window glass, a china or glazed plate, or any smooth surface, perfectly clean, as grease or a particle of dust would impede its motion. Wet the surface, and give the plane a slight inclination, when, if properly managed, a rotatory motion will commence, which may be kept up for any length of time by giving alternate inclinations to the plane surface, according to the movements of the crystal ; to heighten the pleasing effect of which, a variety of paper figures, harlequins, waltzers, &c. may be attached. The first trial of the experiment had better be made by giving a slight rotatory motion to the crystal."

## VENTRILOQUISM.

THE main secret of this surprising art simply consists in first making a strong and deep inspiration, by which a considerable quantity of air is introduced into the lungs, to be afterwards acted upon by the flexible powers of the larynx or cavity situated behind the tongue, and the trachea, or windpipe : thus prepared, the expiration should be slow and gradual. Any person, by practice, can, therefore, obtain more or less expertness in this exercise ; in which, though not apparently, the voice is still modified

by the mouth and tongue ; and it is in the concealment of this aid, that much of the perfection of ventriloquism lies.

But the distinctive character of ventriloquism consists in its imitations being performed by the voice *seeming* to come from the stomach : hence its name, from *venter*, the stomach, and *loquor*, to speak. Although the voice does not actually come from that region, in order to enable the ventriloquist to utter sounds from the larynx without moving the muscles of his face, he strengthens them by a powerful action of the abdominal muscles. Hence, he speaks by means of his stomach ; although the throat is the real source from whence the sound proceeds. It should, however, be added, that this speaking distinctly, without any movement of the lips, at all, is the highest perfection of ventriloquism, and has but rarely been attained. Thus, MM. St. Gille and Louis Brabant, two celebrated French ventriloquists, appeared to be absolutely mute while exercising their art, and no change in their countenances could be discovered.

It has lately been shown, that some ventriloquists have acquired by practice the power of exercising the veil of the palate in such a manner, that, by raising or depressing it, they dilate or contract the inner nostrils. If they are closely contracted, the sound produced is weak, dull, and seems to be more or less distant ; if, on the contrary, these cavities are widely dilated, the sound will be strengthened, the voice become loud, and apparently close to us.

Another of the secrets of ventriloquism, is the uncertainty with respect to the direction of sounds. Thus, if we place a man and a child in the same angle of uncertainty, and the man speaks with the accent of a child, without any corresponding motion in his mouth or face, we shall necessarily believe that the voice comes from the child. In this case, the belief is so strengthened by the imagination ; for if we were directed to a statue, as the source from which we were to expect sounds to issue, we should still be deceived, and refer the sounds to the lifeless stone or marble. This illusion will be greatly assisted by the voice being totally different in tone and character from that of the man from whom it really comes. Thus, we see how easy is the deception when the sounds are required to proceed from any given object, and are such as they actually yield.

The ventriloquists of our time, as M. Alexander and M. Fitz-James, have carried their art still further. They have not only spoken by the muscles of the throat and the abdomen, without moving those of the face, but have so far overcome the uncertainty of sound, as to become acquainted with modifications of distance, obstruction, and other causes, so as to imitate them with the greatest accuracy. Thus, each of these artists has succeeded in carrying on a dialogue ; and each, in his own single person and with his own single voice, has represented a scene apparently with several actors. These ventriloquists have likewise possessed such

power over their faces and figures, that, aided by rapid changes of dress, their personal identity has scarcely been recognised among the range of personations.

Vocal imitations are much less striking and ingenious than the feats of ventriloquism. Extraordinary varieties of voice may be produced, by speaking with a more acute or grave pitch than usual, and by different contractions of the mouth. Thus may be imitated the grinding of cutlery on a wheel, the sawing of wood, the frying of a pancake, the uncorking of a bottle, and the gurgling noise in emptying its contents.

#### CONCLUSION.

The following hints are of considerable importance to the amateur exhibitor.

1. Never acquaint the company beforehand with the particulars of the feat you are about to perform, as it will give them time to discover your mode of operation.

2. Endeavour, as much as possible, to acquire various methods of performing the same feat, in order that if you should be likely to fail in one, or have reason to believe that your operations are suspected, you may be prepared with another.

3. Never yield to the request of any one to repeat the same feat, as you thereby hazard the detection of your mode of operation; but do not absolutely refuse, as that would appear ungracious. Promise to perform it in a different way, and then exhibit another which somewhat resembles it. This manœuvre seldom fails to answer the purpose.

4. Never venture on a feat requiring manual dexterity, till you have previously practised it so often, as to acquire the necessary expertness.

5. As diverting the attention of the company from too closely inspecting your manœuvres is a most important object, you should manage to talk to them during the whole course of your proceedings. It is the plan of vulgar operators to gabble unintelligible jargon, and attribute their feats to some extraordinary and mysterious influence. There are few persons at the present day credulous enough to believe such trash, even among the rustic and most ignorant; but, as the youth of maturer years might inadvertently be tempted to pursue this method, while exhibiting his skill before his younger companions, it may not be deemed superfluous to caution him against such a procedure. He may state, and truly, that everything he exhibits can be accounted for on rational principles, and is only in obedience to the unerring laws of Nature; and although we have just cautioned him against enabling the company themselves to detect his operations, there can be no objection (particularly when the party comprises many younger than himself) to occasionally show by what simple means the most apparently marvellous feats are accomplished.

## TRICKS WITH CARDS.



TELLING THE NUMBER OF CARDS BY THEIR WEIGHT.

PAGE 335.

ALTHOUGH proficiency in games with cards is, in our opinion, a most pernicious accomplishment for youth, and one which cannot be too severely reprobated, we do not consider **SLEIGHT-OF-HAND TRICKS** with a pack of cards at all objectionable, but rather as a source of much harmless amusement; and, under this impression, we do not hesitate to insert the following series of excellent deceptions and sleights-of-hand.

Playing cards are believed to have been invented in Spain as early as the fourteenth century; for, in 1378, John the First, king of Castile, forbade card-playing in his dominions, in an edict which is anterior to any similar legislative measure in other parts of Europe. The figures upon the cards themselves add to the strength of the supposition; for the suits answering to those of spades and clubs have not the same inverted heart and trefoil shape which ours of the present day display, but *espadas*, or swords, and *bastos*, or cudgels, or clubs; so that, in fact, we retain their names though we have altered the figures. At the present time, too, cards are a favourite diversion of the Spaniards, and the monopoly of selling them is vested in the hands of the sovereign.

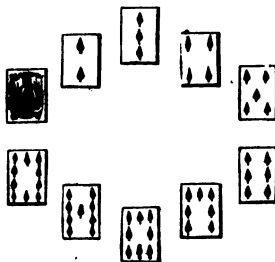
In the reign of Henry the Seventh, card-playing was a very fashionable court amusement in England. The cards then used, differed materially in their figures from those now in vogue, as

(333)



instead of clubs, spades, diamonds, and hearts, they had rabbits, pinks, roses, and the flowers called columbines, upon them; as also bells, hearts, leaves, and acorns, and deer, &c. Let us now turn to the tricks that can be played with cards.

#### TO TELL THE CARD THOUGHT OF IN A CIRCLE OF TEN.



PLACE the first ten cards of any suit in a circular form, as in the annexed figure; the ace being counted as one. Request a person to think of a number or card, and to touch also any other number or card; desire him to add to the number of the card he touched the number of the cards laid out, that is, ten; then, bid him count that sum backward, beginning at the card he touched, and reckon-

ing that card at the number he thought of; when he will thus end it at the card or number he first thought of, and thereby enable you to ascertain what that was. For example, suppose he thought of the number three, and touched the sixth card, if ten be added to six, it will of course make sixteen; and if he count that number from the sixth card, the one touched, in a retrograde order, reckoning three on the sixth, four on the fifth, five on the fourth, six on the third cards, and so on; it will be found to terminate on the third card, which will therefore show you the number the person thought of. When the person is counting the numbers, he should not, of course, call them out aloud.

#### • TO GUESS THE CARD THOUGHT OF.

To perform this trick, the number of cards must be divisible by 3, and it is more convenient that the number should be odd. Desire a person to think of a card; place the cards on the table with their faces downward, and, taking them up in order, arrange them in three heaps, with their faces upward, and in such a manner that the first card of the pack shall be first in the first heap, the second the first in the second heap, and the third the first of the third; the fourth the second of the first, and so on. When the heaps are completed, ask the person in which heap the card he thought of is, and when he tells you, place that heap in the middle; then turning up the packet, form three heaps, as before, and again inquire in which heap the card thought of is; form the three heaps afresh, place the heap containing the card

thought of again in the centre, and ask which of them contains the card. When this is known, place it as before, between the other two, and again form three heaps, asking the same question. Then take up the heaps for the last time, put that containing the card thought of in the middle, and place the packet on the table with the faces downward, turn up the cards till you count half the number of those contained in the packet; twelve, for example, if there be twenty-four, in which case the twelfth card will be the one the person thought of. If the number of the cards be at the same time odd, and divisible by three, such as fifteen, twenty-one, twenty-seven, &c., the trick will be much easier, for the card thought of, will always be that in the middle of the heap in which it is found the third time, so that it may be easily distinguished without counting the cards; in reality, nothing is necessary but to remember, while you are arranging the heap for the third time, the card which is the middle one of each. Suppose, for example, that the middle card of the first heap be the ace of spades; that the second be the king of hearts; and that the third be the knave of hearts: if you are told that the heap containing the required card is the third, that card must be the knave of hearts. You may therefore have the cards shuffled, without troubling them any more; and then, looking them over for form sake, may name the knave of hearts when it occurs.

#### TO TELL THE NUMBER OF CARDS BY THE WEIGHT.

Take a pack of cards, say forty, and privately insert amongst them two cards rather larger than the others; let the first be the fifteenth, and the other the twenty-sixth, from the top. Seem to shuffle the cards, and cut them at the first long card; poise those you have taken off in your hand, and say, "There must be fifteen cards here;" then cut them at the second long card, and say, "There are but eleven here;" and poising the remainder, exclaim, "And here are fourteen cards." On counting them, the spectators will find your calculations correct.

#### THE ODD TEN.

Take a pack of cards, let any person draw one and put it back again into the pack, but contrive so that you can find it at pleasure, which, by a little practice, you will be able to do, with the greatest facility. Shuffle the pack, and request another of the party to draw a card, but be sure that you force upon him the card which was drawn before; go on in this way, until ten persons have drawn the same card; then shuffle the cards, and show the one you forced, which, from its having been so managed, must of course be the one which every person drew.

## THE QUEEN GOING TO DIG FOR DIAMONDS.

To perform this trick neatly, proceed as follows:—Tell the company that here are four queens in search of some diamonds (laying down the four queens in a row, and putting four common cards, of the suit of diamonds, separately upon the queens); to aid them in the search, they, of course, require a spade (laying down four common cards, of the suit of spades, upon the queens). Their husbands send with them, as an escort, a guard of honour (laying down the four aces); notwithstanding which they are waylaid by knaves (laying down the four knaves), who had formed a conspiracy to kill, and afterwards rob them: for which purpose they had each provided themselves with a club (putting down four common cards of the suit of clubs). The kings hearing of this plot, resolve to follow and protect their queens (laying down the four kings); and, like chivalrous princes, taking good heart, proceed after them (laying down four common cards of the suit of hearts). Now gather the four heaps into one, beginning at the left hand, and allow several persons to cut them; and when a common card of the suit of hearts comes to the bottom of the pack, lay all out again in four heaps, and the cards will follow in the same order as when you laid them down at first.

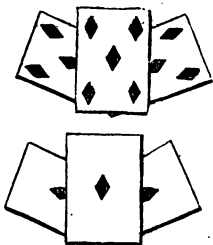
## THE KNAVES AND THE CONSTABLE.

Select the four knaves from a pack of cards, and one of the kings to perform the office of constable. Secretly place one of the knaves at the bottom of the pack, and lay the other three with the constable, down upon the table. Proceed with a tale to the effect that three knaves once went to rob a house; one got in at the parlour window (putting a knave at the bottom of the pack, taking care not to lift the pack so high that the one already at the bottom can be seen); one effected his entrance at the first floor window (putting another knave in the middle of the pack); and the other, by getting on the parapet from a neighbouring house, contrived to scramble in at the garret window (placing the third knave at the top of the pack); the constable vowed he would capture them, and closely followed the last knave (putting the king likewise upon the top of the pack). Then request as many of the company to cut the cards, as please; and tell them that you have no doubt the constable has succeeded in his object, which will be quite evident, when you spread out the pack in your hands; as the king and three knaves will, if the trick is neatly performed, be found together. A very little practice only is required to enable you to convey a knave or any other card secretly to the bottom of the pack.

**TO HOLD FOUR KINGS OR FOUR KNAVES IN YOUR HAND, AND  
TO CHANGE THEM SUDDENLY INTO BLANK CARDS, AND  
THEN TO FOUR ACES.**

It is necessary to have cards made on purpose for this trick,—half cards, as they may be properly termed, that is, one half kings or knaves, and the other half aces. When you lay the aces one over the other, of course nothing but the kings or knaves can be seen; and on turning the kings or knaves downward, the four aces will make their appearance. You must have two perfect cards, one a king or knave, to put over one of the aces, else it will be seen; and the other an ace, to lay over the kings or knaves. When you wish to make them all appear blank, lay the cards a little lower, and by hiding the aces, they will appear white on both sides; you may then ask which they wish to have, and may show kings, aces, or knaves, as they are called for.

**THE FIFTEEN THOUSAND LIVRES.**



For this trick, prepare two cards like the accompanying engraving; and have a common ace and five of diamonds. Hold down the five of diamonds and the two prepared cards, as shown in the next engraving; and say, "A certain Frenchman left fifteen thousand livres, which are represented by these three cards, to his three sons; the two youngest agreed to leave their five thousand, each of them, in the hands of the elder, that he might improve it." While you are telling this story lay the five on the table, and put the ace in its place; at the same time artfully change the position of the other two cards, so that the three cards appear as in this engraving. Then, resuming the tale, relate that "the eldest brother, instead of improving the money, lost it all by gaming, except three thousand livres, as you here see (laying the ace on the table, and taking up the five). Sorry for having lost the money, he went to the East Indies with these three thousand, and brought back fifteen thousand." Then show the cards in the same position as at first. To render this deception agreeable, it must be performed with dexterity, and should not be repeated, but the cards immediately put in the packet; and you should have five common cards ready to show, if any one desire to see them.

**SEVERAL CARDS BEING PRESENTED IN SUCCESSION TO SEVERAL PERSONS, TO GUESS WHICH EACH HAS THOUGHT OF.**

SHOW as many cards to each person as there are persons to select; that is to say three, if there be three persons. When the first has thought of a card, lay aside the three from which he has made his choice. Present the same number to the second person to think of one, and lay aside those three cards also. Having done the same with the third person, lay out the three first cards with their faces uppermost, above them the next three cards, and above these also the last three; so that all the cards may be disposed in three heaps, each consisting of three. Then ask each person in which heap the card is which he thought of; that being known, it will be easy to tell these cards; for that of the first person will be the first in the first heap, that of the second the second of the next heap, and that of the third person will be the third of the last heap.

**THE CARD DISCOVERED BY THE TOUCH OR SMELL.**

OFFER the long card, or any other that you thoroughly well know; and, as the person who has drawn it holds it in his hand, pretend to feel the pips or figures on the under side, with your fore-finger, or smell it, and then sagaciously declare what card it is.

If it be the long card, you may give the pack to the person who drew it, and allow him either to replace it or not. Then take the pack, and feel whether it be there or not; shuffle the cards in a careless manner, and, without looking at it, decide accordingly.

**THE CARD IN THE EGG.**

To perform this feat, provide a round hollow stick, about ten inches long and three quarters of an inch in diameter, the hollow being three-eighths of an inch in diameter. Also, have another round stick to fit this hollow, and slide in it easily, with a knob to prevent its coming through. Our young readers will clearly understand our meaning, when we say, that in all respects it must resemble a pop-gun, with the single exception that the stick which fits the tube, must be of the full length of the tube, exclusively of the knob.

Next steep a card in water for a quarter of an hour, peel off the face of it, and double it twice across, till it becomes one-fourth of the length of a card, then roll it up tightly, and thrust it up the tube till it becomes even with the bottom. You then thrust in the stick at the other end of the tube till it just touches the card.

Having thus provided your magic wand, let it lie on the table

until you have occasion to make use of it, but be careful not to allow any person to handle it.

Now take a pack of cards, and let any person draw one; but be sure to let it be a similar card to the one which you have in the hollow stick. This must be done by forcing. The person who has chosen it will put it into the pack again, and, while you are shuffling, you let it fall into your lap. Then, calling for some eggs, desire the person who drew the card, or any other person in the company, to choose any one of the eggs. When he has done so, ask if there be anything in it? He will answer there is not. Place the egg in a saucer;—break it with the wand, and pressing the knob with the palm of your right hand, the card will be driven into the egg. Then show it to the spectators.

A great improvement may be made in this feat, by presenting the person who draws the card with a saucer and a pair of forceps, and instead of his returning the card to the pack, desire him to take it by the corner with the forceps and burn it, but to take care and preserve the ashes; for this purpose you present him with a piece of paper (prepared as hereafter described), which he lights at the candle, but a few seconds after; and before he can set the card on fire, it will suddenly divide in the middle and spring back, burning his fingers if he do not drop it quickly. Have another paper ready and desire him to try that; when he will most likely beg to be excused, and will prefer lighting it with the candle.

When the card is consumed, say that you do not wish to fix upon any particular person in company to choose an egg, lest it might be suspected he was a confederate; therefore, request any two ladies in company to choose each an egg, and having done so, to decide between themselves which shall contain the card; when this is done, take a second saucer, and in it receive the rejected egg, break it with your wand, and show the egg round to the company; at the same time drawing their attention to the fact of those two eggs having been chosen from among a number of others, and of its not being possible for you to have told which of them would be the chosen one.

You now receive the chosen egg in the saucer containing the ashes, and having rolled it about until you have blacked it a little, blow the ashes from around it into the grate; you then break the egg with the same wand, when, on touching the spring, the card will be found in the egg.

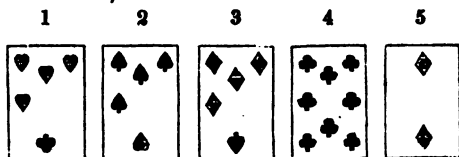
*The method of preparing the paper mentioned in the above feat is as follows:—*Take a piece of letter paper, about six inches in length and three-quarters of an inch in breadth, fold it longitudinally, and with a knife cut it in the crease about five inches down; then take one of the sides which are still connected at the bottom, and with the back of the knife under it, and the thumb of the

right hand over it, curl it outwards as a boy would the tassels of his kite; repeat the same process with the other side, and lay them by for use. When about using them (but not till then, as the papers will soon lose their curl if stretched), draw them up so as to make them their original length, and turn the ends over a little, in order that they may remain so; when set on fire, they will burn for a minute or two, until the turn-over is burnt out, when the lighted ends will turn over quickly, burning the fingers of the holder: this part of the trick never fails to excite the greatest merriment.

#### THE CHANGEABLE CARDS.

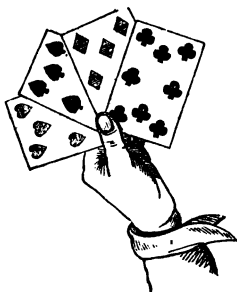
HAVING shuffled a pack, select the eight of each suit, and the deuce of diamonds; hold the four eights in the left hand, and the deuce in the right, and having shown them, take in the deuce among the four in the left hand, and throw out one of the eights; give them to be blown upon, when they will be turned into four deuces; you now exchange one of the deuces for the eight, and giving them again to be blown upon, they will appear all black cards; you again take in the deuce, and discard the eight, when, by blowing on them, they will all turn red; you now, for the last time, take in the eight, and throw away a deuce, when they will be found to be four eights and a deuce, as they were at first.

To perform this ingenious deception you procure five plain cards the size of playing cards, which you paint to resemble the five cards as under,



and mixing them with a common pack, you next, under the pretence of selecting the eight of each suit, and the deuce of diamonds, take out your false cards (Nos. 1, 2, 3, 4), which you hold as under; and taking No. 5 in your right hand, you show your company that there are the four eights and the deuce of diamonds; you should likewise hold them up to the light, to let them see that they are not double, which you may do without fear of detection, as the lower parts of the cards will be so opaque, that the deficiency of spots will not be perceived; you now place the deuce of diamonds between Nos. 3 and 4, the latter of which you withdraw and throw on the table, but take care not to do so until you have first taken in No. 5 (the deuce of

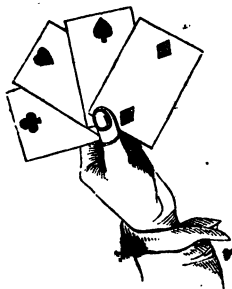
diamonds), else the deficiency of spots on No. 3 will cause the trick to be discovered : you then close those four cards together,



and taking them by the top, with the fingers and thumb of the right hand, having the thumb on the face of the cards and the fingers on the back, hold them out with their faces turned towards the floor, and desire some person to blow upon them ; when this has been done, give your wrist a turn, so that the top part of the cards will now be the bottom ; in fact, you turn the cards upside down ; hold them up to your mouth, pretending to breathe on them, which not only tends to deceive your company, but gives you time to arrange your cards, which

you do by opening them out to the right hand, when they will appear to be four deuces, in the order represented in the following figure : you may again hold them up to the light, to show that they are single cards.

The next change, although rather more difficult to accomplish, is decidedly the best of the whole, inasmuch as the cards are never shut up, nor removed for one moment from under the eye. Having shown them to be four deuces, you take in the eight of clubs, and place it between Nos. 3 and 5 ; withdraw No. 5, and



holding it up to the light, you desire the company to observe that the cards are not double, and while all eyes are turned to this card, turn your left hand, containing the other four, with its back towards the ceiling, and the faces of the cards towards the floor, keeping them in a horizontal position ; throw down the deuce of diamonds, and continue your remarks on the cards not being double, by saying, "You perceive any of them will bear examination ;" at the same time take hold of the card, next but one to your right hand, with the fingers and thumb of

that hand, taking care to have the thumb above and the fingers underneath the card, take it out, still keeping it in a horizontal position, and while making the above observation, turn it round with the fore-finger of the right hand, until you have got hold of



the other end, when, before anybody has time to take hold of it, return it to the situation from which you took it, taking care that you put it exactly in the same angle.

Now hold those cards out, with the backs upward to be blown upon ; but you have no occasion to shut them up at this change, as, if you turn them over, it will be perceived that they are all black ; you now take in the deuce of diamonds, as you did at the first change, and discard the eight of clubs, close them up, and taking them *by the top*, hold them out to be blown upon, give your wrist a turn as before, open them out to yourself while pretending to breathe on them, when, on showing them to your company, they will be all red ; you now again take in the eight of clubs, throwing out the deuce of diamonds on the table, with its face downwards, and taking hold of the card next but one to your right hand, throw it down in the same manner ; whilst performing this latter part, you should say, " I take in the eight, and I throw out the deuces—Oh ! I beg pardon—only one of the deuces ;" at the same moment take up the last card you threw out, by the opposite end to that which you formerly held it by, and return it to its own place again, taking particular care of the angle ; let them be blown upon, when they will be found to be four eights and a deuce, as they were at first.

Should any persons now desire to examine the cards, tell them you can only give them one at a time, breathe upon the deuce of diamonds and present it to them ; when they have returned it to you, and before they have time to ask for another, hand them the eight of clubs, saying, that perhaps they would like to examine a black card ; they seeing you so confident, will scarcely ask for any more. We recommend our young friends to practise this trick well before they attempt to show it, as it is too good a one to hazard its discovery by impatience, which is too frequently the case.

The two preceding tricks have been extracted from the very amusing manual, entitled, " Parlour Magic."



## AMUSEMENTS IN CHEMISTRY.



COMBUSTION OF CHARCOAL AND NITRIC ACID.

See page 349.

The wonderful and sudden transformations with which Chemistry is conversant; the violent activity often assumed by substances usually considered the most inert and sluggish; and above all, the insight it gives into the nature of innumerable operations which we see daily carried on around us, have contributed to render it the most popular, as it is one of the most extensively useful, of the sciences.

SIR JOHN HERSCHEL.

SIR HUMPHRY DAVY has beautifully observed of chemistry: "Its beginning is pleasure, its progress knowledge, and its objects truth and utility." Thus, through chemistry, we know the nature of the air we breathe, of the water we drink, of the earth we tread upon, and of the various substances which compose our mortal frame. We can, by means of this science, decompose and weigh the constituent parts of a tear; calculate how many grains of perspiration the hand of a person will emit in the lapse of an hour; and ascertain the nature of the poison which the wasp infuses in our flesh through its stings. In fact, most of the substances belonging to our globe are subject to chemical action; of which heat is the great and main agent, as well as the most active principle in nature.

(343)

The cause of **HEAT**, or that which originates the sensation we call so, is named **caloric**, which has two properties that affect every body it combines with. The first is that of increasing or diminishing bulk; for, on heating substances, caloric insinuates itself among their component particles, and causes them to separate; consequently, the bulk of the body, subject to this process, increases. Experiments 2 and 3 elucidate this principle, which has led philosophers to assert that caloric has a repulsive action, and is the antagonist of attraction, by which the particles of matter are held together. Attraction, therefore, cannot take place, unless the caloric be extracted from amongst the particles of matter; and, when this is done, liquids or fluids become solids, their particles being joined by attraction or cohesion; whilst solids are rendered fluids through the introduction of caloric amongst their constituent particles. If, after a body has become fluid, caloric be again applied to it, the particles of matter are still farther separated, and caloric forces itself amongst them in so great a quantity, as to form another fluid, which is termed vapour or gas. Thus, the three forms of matter, the solid, the liquid, and the gaseous, are the immediate result of the proportion of caloric contained in them. The other property of caloric is to seek an equilibrium. If you place a cup of cold water in a basin of warm water, heat will be immediately communicated from the latter to the former, so as to leave both of the same temperature. The various sensations of heat and cold that we experience, proceed from the same cause. If we touch a hot substance, caloric passes from it to our own hand, and produces the sensation of warmth we feel; whilst, when we touch a cold body, our hand becomes less warm than before, because caloric, in seeking its equilibrium, flows to the other substance, and will continue to pass from the hand to the body pressed by it, until both have acquired the same temperature.

This great and active principle exists in two states: one sensible to the touch, and ascertainable by means of the thermometer, the other insensible to both. In this latter state, it is called *latent heat*. The former is that superabundance of caloric which passes, or is communicated from, one body to another, and, therefore, called *free caloric*, such as the caloric which is imparted by the warm to the cold water, and generally by hot to cold bodies in search of its equilibrium; latent heat is that which is concealed or incorporated with the particles of matter, and which neither affects our touch nor the thermometer, but is perceivable only through its endeavour to find an equilibrium, or by means of chemical and mechanical action. For example, if you touch a piece of marble, your hand feels cold, because caloric is instantaneously transmitted by it to the marble; and you might suppose that a body, which so rapidly absorbs the heat of your

hand, contained none in itself; but place upon it a piece of ice, and you will see that the latter will melt; the reason being that the marble, possessing more latent heat or insensible caloric than the ice, a portion of it passes from the former to the latter in order to establish its equilibrium.

If you throw some water upon quick-lime, the lime will seem to become hot. This substance, however, remains in the same state; but the latent heat of the water is, by the *chemical action* of the lime on that liquid, extricated, and thus becomes apparent to our senses. Experiment 1, shows another example of the disengagement of latent heat.

If you place a glass of water in a mixture of salt and snow, the water will be frozen; the reason of which is, that the salt and snow, in passing from the solid to the liquid state, require so much caloric, that they absorb all the caloric the water can impart. The water transmits to the mixture of salt and snow all its free caloric, until it reaches the freezing point; from this moment, until it becomes a solid body, it parts with that quantity of latent heat which was requisite to keep its particles separate, or in a state of liquefaction, but not with all; for, as it has been stated, latent heat exists in everything. Thus, if after the water has been completely frozen, you take the ice from the glass, and rub it against another piece of ice, its latent heat will be disengaged by the friction, and the ice dissolved.

The foregoing facts, and the experiments which elucidate them, develop to us two other facts. The first is, that chemical mixture or action is a source of caloric; since, by combining two or more substances, it is forced even from its latent state; the second, that cold, or the sensation so called, is but a negative quality,—no more in reality than the diminution or comparative absence of caloric; for until this has taken place, cold is not felt.

**MECHANICAL ACTION** is another of the principal means by which heat is obtained. When caloric is extricated by friction or percussion, mechanical action is said to be employed. If two pieces of dry wood be rubbed together for some length of time, caloric will be produced in such a quantity as to cause them to burn; friction, therefore, in this case, is the means of the accumulation of caloric. Thus, the wheels of waggons and other carriages have taken fire when they have not been greased: the cause in these instances being friction. Of percussion there is an example in the mode of obtaining sparks of fire from the flint and steel. Through the concussion of these two substances, a portion of the latent heat of the flint is evolved, that melts the minute particles of the steel, which fall red-hot upon the tinder. The latent heat of iron is extracted by smiths in the same manner, through percussion, for the purpose of rendering it hard, (see experiment 4.)

as that substance, with a loss of its caloric, loses its property of malleability.

**COMBUSTION** is the next means by which caloric is evolved and accumulated in great quantities. Combustion, according to the generally received theory, and the opinion of Sir Humphry Davy, has for its principal agent, oxygen, one of the constituents of atmospheric air. If you raise the temperature of a combustible body to that high degree commonly defined by the phrase red-hot, either by bringing it into contact with an ignited substance, or by chemical action, (as in experiments 5, 6, 7, 8, 9, 10, 11, 12,) the oxygen gas of the atmosphere will instantly combine with the accumulated caloric, and cause the substance to burn. The results of combustion are either consumption or a change of chemical property; and this constitutes the difference between *ignition* and *combustion*, two words very frequently taken for synonymes. Ignition, however, is merely the accumulation of caloric to the point of rendering a substance, though not a combustible, red-hot. Clay and chalk, for instance, may be ignited, but they could not be made to burn, because they have not the combustible property, or the principle which attracts oxygen. The sparks of steel which fall upon the tinder are merely *ignited*, while the tinder, on the contrary, having its caloric accumulated by contact with them, and being a combustible substance, combines immediately with the oxygen, and *burns*. Flame is another phenomenon of combustion, supposed to be produced by the disengagement of the electricities of the burning body, and of the oxygen gas; for as we have elsewhere stated (*vide* experiments on electricity), electricity exists in every substance in nature: examples of combustion are common in every house, for neither a candle, nor a fire, nor a pipe, or cigar can be lighted without it.

**CHEMICAL ATTRACTION** is another principle of chemistry abundantly exemplified in daily life.

The kitchens of the rich are often large laboratories, where the principle of chemical attraction is almost always being elucidated. If viands acquire a different flavour than they would have if only boiled in water, and if sauces combine, it is by means of chemical attraction, or the attraction of composition, which is the peculiar tendency possessed by bodies of a different nature to combine with each other. If, for example, you pour some oil into a phial, and gradually mix with it some hartshorn, showing both substances together, the oil and ammonia, or hartshorn, having a great affinity for each other, will combine; that is to say, every particle of oil will mix and blend with the particles of ammonia, so as to form a new substance, with properties and appearance entirely different, both from those of the oil and of the ammonia.

It is to be remembered, that when two substances chemically combine, they invariably produce a compound which is essen-

tially different in its properties to themselves: thus, two bodies, active poisons, muriatic acid and soda, when combined, form common salt, a really important necessary of life; the air we breathe is composed of the same elements as one of the most deadly poisons; yet, from the different proportions in which the elements are combined, it is perfectly innoxious.

The same principle by which the combinations, or compounds of various substances, are made, enables us to work their decomposition. They are blended together, and converted into new substances by the power of attraction, and by it also separated, and returned to their original state; for, if to a substance that has been formed by the affinity of two or three bodies for each other, you add a third that has a stronger attraction for one of them than the two or three original ingredients had amongst themselves, that ingredient will quit the compound to combine with the newly-introduced substance, and thus decomposition will take place by the same power which had promoted the combination of the compounds. In the experiment just described, the oil and the ammonia combined from their affinity to each other, and a new substance was the result of the combination; but if to this you add, very cautiously, a little sulphuric acid, decomposition will be instantly effected; because the acid, having more attraction for the ammonia than for the oil, will combine with it, and the oil will be left alone, or *precipitated*. Change of colour is one of the most striking examples of chemical combination; as the most exquisite colours may be made and varied, and re-made, almost endlessly, merely by the aid of a few drops of some liquid being added to others, to which they bear affinities. Sympathetic Inks are pleasing experiments of this kind.

The nature of soap, an article so essential to our comfort, affords another elucidation of chemical attraction or combination. It has but recently been ascertained that all fats, and oils made from fats, consist of two substances—one solid called *stearine*, and the other liquid, called *elaine*. When a hot ley of some alkali, as soda or potash, is mixed with fat or oil, the two constituents, *stearine* and *elaine*, react on one another, producing a solid pearly matter, called *margaric acid*, and a fluid matter, *oleic acid*: these combine with the alkali, whilst the sweet principle is precipitated. Soap, therefore, is composed of an *alkaline*, *margarate*, and *oleate*; these two last substances being extracted and separated from the sweet principle by their affinity for the alkali, are by the same formed into a compound with it. Thus in common soap, we have first an instance of decomposition, and next, one of composition by the power of chemical attraction.

As long as any compound substance retains its character, it invariably consists of the same elements blended together in exactly the same proportions. Thus, water is a compound com-

posed of one part of hydrogen, and eight of oxygen; and if those elements were to mix together in other proportions, they would not make that substance which we call water. If a compound be composed of two or more elements, the diminution of one, or the preponderance of another, produces a totally different result, as is clearly exemplified in sugar and starch: these, though differing widely from each other in appearance, are composed of the same elements, hydrogen, oxygen, and carbon, in different proportions; but sugar must always possess the same quantities of those elements, else it will cease to be sugar; and starch, the requisite quantity of those elements, else it will cease to be starch.

The examples and experiments we have given to elucidate the principle of attraction or affinity will serve also to show the power which acids exercise on metals: they are, in fact, the only metallic solvents. The process, however, of dissolving a metal by means of an acid, implies a double chemical action: the first, the oxidation of the metal, that is to say, its absorption of the oxygen gas contained in the acid; the second, its solution. The first commences the moment the acid is poured upon the metal, and lasts as long as the effervescence continues; for this is caused by the transmission of oxygen from the acid to the metal; and it is only when this is completed, or the metal oxidated, that solution commences, and, with it, the formation of a new compound, as we have already explained. (See Experiments, 14, 15, 16, 17, and 18.)

Crystallisation is the most beautiful perhaps of all experiments in the attraction of composition; and as we shall treat upon it in a separate chapter, we refer our readers to it, for the experiments in elucidation of its principles.

Thus far, the young reader has been made acquainted with some of the important facts which the science of chemistry investigates. We shall conclude our outline with a slight notice of the oxygen gas, which has already been mentioned as performing an important part in several of the phenomena we have explained.

Gases, in general, are fluids supposed to consist of a chemical combination of caloric, with a basis or substance, the name of which they take: thus, *carbonic gas* is a combination of caloric and particles of carbon; *phosphuretted hydrogen gas*, a combination of particles of water and phosphorus with caloric. Of all gases, oxygen is the most important and extensive its agency. It is, as we have seen, the soul of combustion, and has the first place in the formation of compounds, as well as in decomposition. Combined with nitrogen gas, it forms the air we breathe; with hydrogen gas, the water we drink; and the acids, the alkalies, the earths, and oxides, are all formed by the combination of this potent agent with minerals and metallic bodies.

We shall now proceed to our experimental illustrations.

## HEAT.

1.—Put some water into a glass or cup, and pour upon it about half its quantity of sulphuric acid; upon stirring them together, the temperature will rise to many degrees above boiling water. In mixing the acid with the water, the greatest care should be taken not to do it too suddenly, as the vessel may break from the sudden intense heat, and the acid be spilt on the hands, clothes, &c. The greatest caution is also necessary in using it, as it will burn every thing it is dropped on.



2.—The expansive force of spirit of wine when heated, may be shown by placing a glass bulb, of the size of a pea, filled with it, into the wick of a candle; the liquid will in a short time expand so much, that it will burst the bulb, and put out the light. It is necessary to retire as far from the candle as possible, as when the globule explodes, the pieces are scattered about in all directions.

3.—The great expansion of bulk which takes place when water is converted into steam, may also be shown by placing a glass globule like that represented in the preceding experiment, half filled with water, into the wick of a candle; the instant the steam is produced, a violent explosion takes place; it is of course necessary to get out of the reach of the little fragments of glass ejected by the explosion.

4.—If a piece of iron is hammered smartly on an anvil, its latent heat will be evolved in a short time to such a degree, that the iron will become almost red hot.

5.—Put a little calcined or pure magnesia in a tea-cup on the hearth, and suddenly pour upon it as much concentrated sulphuric acid as will cover it: in an instant sparks will be ejected, and the mixture will be completely ignited.

6.—Put a small quantity of pulverized charcoal into a warm tea-cup, and pour upon it some nitric acid; ignition will instantly take place, and sparks will be thrown out in all directions.

7.—Pour a little clear water into a small glass tumbler, and put one or two pieces of phosphuret of lime into it. In a short time, flashes of fire will dart from the surface of the water, and terminate in ringlets of smoke, ascending in regular succession.

8.—Add a grain or two of chlorate of potass to a tea-spoonful of alcohol, and let fall upon it a few drops of strong sulphuric acid, the mixture will immediately burst into a flame.

9.—Thinly spread some dry nitrate of copper on a piece of tin



foil, three or four inches square, and wrap it up; there will not be any effect produced. Unfold the tinfoil, and sprinkle a very small quantity of water on the nitrate of copper, wrap it up again as quickly as possible, and press down the edges closely. Considerable heat, attended with fumes, will now be evolved; and if the experiment be dexterously managed, it will ignite. This shows that nitrate of copper has not any effect on tin, till in a state of solution.

10.—Mix together two grains of chlorate of potass, and about three of sulphur, both in fine powder; if a little of the mixture be dropped into a wine-glass containing a small quantity of sulphuric acid, a beautiful column of flame will burst out.

11.—Put three or four grains of chlorate of potass into a mortar; reduce it to a powder with a pestle, and then add a little flour of sulphur, very finely pulverised. On rubbing the two materials together, a sharp, crackling detonation will ensue, unattended with danger. This experiment may be repeated several times with the same materials.

12.—Fill a saucer with water, and drop a small piece of potassium into it; the instant it touches the water, it will burst, with a slight explosion, into a brilliant violet-coloured flame. It will continue burning for a short time on the surface of the water, darting from one side of the vessel to the other with great violence, like a beautiful fire-ball. Or, if the potassium be thrown upon ice, it will likewise instantly take fire.

13.—Pulverise separately one ounce of crystallized muriate of ammonia, an equal quantity of nitrate of potash, and two ounces of sulphate of soda; mix them together in a goblet with four ounces of cold water, and immediately immerse in the mixture a thin glass tube, containing cold water; in a short time it will freeze, even in a warm room, or in the midst of summer.

14.—Take a very thin glass bulb, half filled with water, and continue to drop ether so slowly upon it, that it may evaporate, and not fall from the surface of the glass; the water inside will quickly be frozen, and this effect will take place sooner if the bulb be held in a current of air.

15.—Put into a wine-glass a few tea-spoonfuls of a concentrated solution of silicated potash, and add to it gradually, drop by drop, sulphuric acid. If these two liquids be stirred together with a glass rod, they will become converted into an opaque, white, and almost solid mass.

16.—Pour a small quantity of water in some muriate of lime, just sufficient to saturate, not liquefy it; then let some concentrated sulphuric acid fall gradually upon this solution, and a solid compound, called sulphate of lime, will be produced.

**HEAT PASSING THROUGH GLASS.**—Heat a poker bright-red-hot, and having opened a window, apply the poker quickly very near to the outside of a pane, and the hand to the inside; a strong heat will be felt at the instant, which will cease as soon as the poker is withdrawn; and may be again renewed, and made to cease as quickly as before. Now, it is well known, that if a piece of glass be so warm as to convey the impression of heat to the hand, it will retain some part of that heat for a minute or more; but, in this experiment, the heat will vanish in a moment. It will not, therefore, be the heated pane of glass that we shall feel, but heat which has come through the glass, in a free or radiant state.

**MAGIC OF HEAT.**—Melt a small quantity of sulphate of potash and copper in a spoon over a spirit-lamp: it will be fused at a heat just below redness, and produce a liquid of a dark green colour. Remove the spoon from the flame, when the liquid will become a solid of a brilliant emerald-green colour, and so remain till its heat sinks nearly to that of boiling water; then, suddenly, a commotion will take place throughout the mass, beginning from the surface; and each atom, as if animated, will start up and separate itself from the rest, till, in a few moments, the whole will become a heap of powder.



**RUPERT'S DROPS.**—Glass is an extremely bad conductor of heat, and the reason why tumblers and other vessels made of glass crack when hot water is suddenly poured into them is, that the interior of the glass expands before the heat can penetrate through the particles on the outside, which are consequently then riven asunder. Small glass toys, called Prince Rupert's drops, which may be obtained at a glass-blower's, show very clearly the effect of heat on bad conductors: They are made by dropping a small quantity of glass, while almost in a liquid state, into water, by which means a globule with a spiral tail is instantly formed; the outside of the globule cools and solidifies the instant it comes into contact with the water before the inner part changes, and this as it would contract, were it not retained and kept in its form by its adherence to the outer crust. If the tail be broken off, or any other injury done to the globule, it will burst with a slight noise and fall to pieces. In order that glass ware may be durable, it is annealed; that is, it is put into an oven, the temperature of which is allowed to decrease gradually.

#### ATTRACTION AND DECOMPOSITION.

1.—Add a little water, impregnated with carbonic acid, to a wine-glass of clear lime-water: these two liquids will combine and form a white substance called carbonate of lime.

2.—Throw a piece of copper into a wine-glass, and pour upon it some nitric acid; these two substances will combine, and a solution of a clear blue colour will be produced. If you plunge into it a piece of iron, (the blade of a knife will answer,) the acid will combine with this new body, and the copper will be precipitated on the blade of the knife in its original state. Should the solution be allowed to remain undisturbed for some days, it will crystallize, and salts of copper will be produced.

3.—Pour a little of the infusion of litmus or of red cabbage, into a wine-glass, add to it a single drop of nitric or sulphuric acid, and it will be instantly changed into a beautiful red colour.

4.—Take a little of the liquid mentioned in the above experiment, either before or after it has been converted to red, add to it a few drops of the solution of potash, or soda, and upon stirring it up, a fine green colour will be produced.

5.—Let a drop of nitrate of copper fall into a glass, then fill it up with water, and it will be perfectly colourless; but upon putting a drop of liquid ammonia, which is also without colour, into the glass, the liquid will change to a beautiful deep blue.

6.—Take some of the blue liquid left by the former experiment, let a drop or two of nitric acid fall into it, and it will become clear as crystal.

7.—A drop of nitrate of copper poured into a glass of water will not produce any change in the colour of the water; but if a small crystal, or a drop of the solution of prussiate of potash be added, the water will become a dark brown.

8.—Mix a little powdered manganese with a little nitre, throw the mixture into a red hot crucible, and a compound will be obtained possessed of the singular property of changing to different colours, according to the quantity of water that is added to it. A small quantity gives a green solution, while a greater quantity changes it to a beautiful rich purple. The last experiment may be varied by putting equal quantities of this substance into separate glasses, and pouring hot water into the one, and a portion of cold water into the other. The hot solution will assume a beautiful green colour, and the cold one a deep purple.

9.—By pouring lime-water into the juice of beet-root, a colourless liquid is obtained; but if a white cloth be dipped in the liquid and dried, in a few hours it will become quite red, by the mere contact of the air.

10.—Spirit of hartshorn dropped into a solution of copper so weak as to be almost colourless, will produce an intense blue, which disappears by adding an acid.

11.—Mix some lime with muriatic acid, and the substance called muriate of lime will be produced. Then add to the mixture some potassa; the acid will combine with this, and the lime will be precipitated in a state of powder.

12.—Mix some magnesia with muriatic acid, and from this combination muriate of magnesia will be produced; if you add to this some potassa, the acid will quit the magnesia, which will consequently be precipitated, and muriate of potassa will result.

13.—To make soap.—Pour a little water into a phial containing about an ounce of olive oil, shake the phial, and if the contents be narrowly examined, we shall find that no union has taken place; but if some solution of caustic potass be added, and the phial then shaken, an intimate combination of the materials will be formed, and a perfect soap be produced.

14.—Pour a little nitro-muriatic acid upon a small piece of gold, or gold-leaf: in a short time, it will be completely dissolved, and the solution assume a beautiful yellow colour.

15.—Pour a small quantity of nitric acid upon a little bit of pure silver, or silver leaf, and it will dissolve in a few minutes.

16.—Pour a little sulphuric acid, diluted with about four times its bulk of water, upon a few iron filings; a strong effervescence will take place, and in a little time the filings will disappear.

17.—Pour some diluted nitric acid on a piece of copper, and in a short time the copper will be dissolved, and the solution will become of a beautiful blue tint.

18.—Pour a little diluted nitric acid upon a piece of lead; it will first convert it into a white powder, and then dissolve it.

19.—Into a solution of nitrate of silver, immerse a small bar of polished copper; on withdrawing the bar, it will be found covered with a fine coating of metallic silver.

20.—A small bar of polished iron immersed in like manner in a solution of nitrate of copper will receive a coating of metallic copper.

21.—A piece of silver immersed in the above solution will remain unchanged; but if immersed in contact with a piece of iron, both, when withdrawn, will be found to be coated with metallic copper.

22.—Pour half an ounce of diluted nitro-muriate of gold into an ale-glass, and put to it a piece of very smooth charcoal. Expose the glass to the rays of the sun, in a warm place; and in a short time the charcoal will be covered over with a beautiful

golden coat. Take it out with a pair of pincers, and inclose it in a glass for show.

23.—Immerse a silk riband in phosphorised æther; when the æther has evaporated, which will be known by the smoking of the phosphorus, dip it into a diluted solution of nitrate of silver, and the metal will appear revived on the surface of the silk.

#### SYMPATHETIC INKS.

ALL writings or drawings executed with Sympathetic Inks are illegible until, by the action of some chemical agents upon a peculiar acid or substance which forms the basis of the ink, a change is effected, and a colour produced from that which was before colourless.

1.—Write with a weak solution of sulphate of iron, and it will be invisible; when dry, wash it over with a solution of prussiate of potash, and the writing will be restored, and turned blue.

2.—Write with some of the above solution, and it will, as before stated, become invisible; but if a brush which has been dipped in a decoction of oak bark, or tincture of galls, be slightly passed over it, it will turn black.

3.—Write with the nitro-muriate of gold, and brush the letters over with muriate of tin in a diluted state. The writing, before invisible, will then appear of a beautiful purple colour.

4.—Dissolve oxide of cobalt in acetic acid, to which add a little nitre; write with this solution, hold the writing to the fire, and it will be of a pale rose colour, which will disappear on cooling.

5.—Dissolve equal parts of sulphate of copper and muriate of ammonia in water; write with the solution, and it will give a yellow colour when heated, which will disappear when cold.

6.—Dissolve nitrate of bismuth in water; write with the solution, and the characters will be invisible when dry, but will become legible on immersion in water.

7.—Dissolve, in water, muriate of cobalt, which is of a bluish-green colour, and the solution will be pink; write with it, and the characters will be scarcely visible; but, if gently heated, they will appear in brilliant green, which will disappear as the paper cools.

8.—Write with a diluted solution of muriate of copper, and the writing will be invisible, when dry; but on being held to the fire, it will be of a yellow colour.

MAGIC LANDSCAPE.—A landscape may be drawn on paper with Indian ink, representing a winter scene; the foliage may

be painted with muriate of cobalt, muriate of copper, and acetate of cobalt, so that by gently warming the picture, the trees, flowers, &c., will display themselves in their natural or verdant colours, which, however, they will only preserve so long as the paper continues warm : this may be repeated as often as required.

#### TO MAKE TEST PAPERS.

TEST papers are useful agents for detecting acids and alkalies in water ; they may be prepared in the following manner. Boil some leaves of a red-cabbage, cut into shreds, in a small quantity of water ; then strain the decoction through a piece of cloth, and dip a few pieces of blotting-paper in it ; let the paper dry, repeat the dipping two or three times, and the paper is then fully prepared. When papers thus prepared are dipped in alkalies, they turn green ; and red, if touched by acids.

LITMUS PAPER is prepared by boiling litmus, and steeping the paper in the liquid ; this paper turns red also, when touched by acids.

TURMERIC PAPER is also used to detect acids and alkalies ; the former turning it from a bright yellow to a reddish brown tint, while the latter have the effect of changing it to a deep red. This paper is prepared by pouring boiling water upon some turmeric, and dipping a piece of paper into the liquid.

#### EXPERIMENTS WITH GASES.

THE GAS-CANDLE.—Provide a strong glass bottle which will contain about eight ounces, or half-a-pint, into which put a few pieces of zinc ; then mix half an ounce of sulphuric acid with four ounces of water, and pour it into the bottle upon the zinc ; fit the mouth closely with a cork, through which put a metal tube which ends upward in a fine opening : the mixture in the bottle will soon effervesce, and hydrogen gas will rise through the tube. When it has escaped for about a minute, apply a lighted paper to the tube, and the gas will burn like a candle, but with a pale flame. Its brightness may be increased to brilliance, by sifting over it a small quantity of magnesia.

GAS FROM INDIAN-RUBBER.—Put caoutchoucine, or the spirit distilled from caoutchouc, or Indian-rubber, into a phial, little more than sufficient to cover the bottom, and the remainder of the phial will be filled with a heavy vapour ; pour this off the spirit into another phial, apply to it a piece of lighted paper, and the vapour will burn with a brilliant flame.

IMITATIVE DIVING-BELL.—Nearly fill a basin with water, and put upon its surface a floating lighted wick or taper ; over this

place a glass goblet, mouth downwards, and push it into the water, which will be kept out, whilst the wick will continue to float and burn under the goblet; thus imitating the living inmate of a diving-bell, which is merely a larger goblet, with a man instead of a candle within it.

**NITROUS OXIDE, OR LAUGHING-GAS.**—Take two or three ounces of nitrate of ammonia in crystals, and put them into a retort; then apply the heat of a lamp to the retort, and take care that the heat does not exceed 500 deg. When the crystals begin to melt, nitrous oxide gas will be evolved in considerable quantities. This gas may also be produced, although not in so pure a state, by pouring nitric acid, diluted with six times its weight of water, on copper-filings, or small pieces of tin. The gas is evolved until the acid begins to turn brown, when the process must be immediately stopped. To inhale the gas: procure an oiled or varnished silk bag, or a bladder furnished with a stop-cock; fill it with nitrous oxide, and, after emptying the lungs of common air, take the stop-cock into the mouth, and at the same time hold the nostrils; the sensations produced will be of a highly pleasing nature. A great propensity to laughter, a rapid flow of vivid ideas, and an unusual fitness for muscular exertion, are the ordinary feelings which it generally produces. The sensations produced by breathing this gas are not the same in all persons; but they are always of an agreeable nature, and not followed by any depression of spirits, like that occasioned by fermented liquors.

**COMBUSTION OF A PIECE OF WATCH-SPRING IN OXYGEN GAS.**—Take a piece of watch-spring, or a fine iron wire, and fasten a little flax, or cotton, to one end of it, which must be dipped in sulphur. The other end of the wire should be fixed into a cork, so that the end may hang straight down. Then fill a bottle, capable of holding about a quart, with oxygen gas, and set its mouth upward; light the sulphured end of the watch-spring or wire, and introduce it into the bottle of gas, suspending it by the cork, which is simply to be laid on the mouth of the bottle. The iron will immediately begin to burn with an intensely vivid light, throwing out a number of beautiful sparks, which fall to the bottom of the bottle, and sometimes break it. This accident may, however, be prevented by putting some sand in the bottle.

**COAL-GAS.**—Fill the bowl of a large tobacco-pipe with pulverised coal, and stop it close with a mixture of pipeclay and sand; then put it into a clear fire, and in a few minutes carburated hydrogen gas will issue from the end of the pipe, which may be ignited, and will burn like a taper, affording an example of the production of gas-light.

**VIOLET-COLOURED GAS.**—Put three or four grains of iodine into

a small test-tube, and seal the other end of it hermetically. If the tube be gently warmed, by holding it over a candle, the iodine will become converted into a beautiful violet-coloured gas or vapour, which, when the tube is suffered to cool, condenses again into minute brilliant metallic crystals, of a bluish colour; this experiment may be repeated, with the same tube and iodine, for any number of times.

#### TO CONVERT SUGAR INTO CHARCOAL.

SIR Humphry Davy, by exposing a piece of charcoal to intense ignition in vacuo, and in condensed azote in a battery, rendered it so hard as to scratch glass; thereby proving the chemical identity of the substances, although so dissimilar in appearance. Loaf sugar is composed of almost the same substance, i. e., carbon; and being a vegetable production composed principally of charcoal in a certain state of combination with water, if some sulphuric acid be poured over a lump of it in a saucer, it will in a few minutes turn black, and appear like a lump of charcoal.

#### THE MAGICAL SPOON.

PUT five ounces of bismuth into a crucible, and, when in a state of complete fusion, add to it three ounces of lead, and two ounces of tin; these will combine, and together form an alloy fusible in boiling water; make it into bars, take them to a silversmith's, and have them fashioned into tea-spoons. Place one of them in a saucer at a tea-table, and the person who uses it will be not a little surprised to find it melt all away as soon as he stirs up the hot tea with it.

#### MIMIC FROST-WORK.

FASTEN a sprig of fresh rosemary, or any similar shrub, to the inside of a small bandbox, near the top; heat a thick tile, and sprinkle it with gum benzoic, and immediately place the bandbox over it, when the acid will be sublimed by the heat, and will condense in a white vapour upon the green plant, giving it the appearance of being covered with hoar-frost.

#### TO MELT A COIN IN A WALNUT-SHELL.

MIX three parts of dried nitre, one of sulphur, and one of fine dry sawdust, and pound them well in a mortar. Press a portion of this powder into a walnut-shell, and also inclose within the shell a thin piece of silver, or copper, rolled up; then fill the shell with some more powder, press it down closely, and set fire to it: the piece of metal will soon be melted, while the nut-shell will be merely blackened.



## TO ILLUMINE THE SURFACE OF WATER.

Wet a lump of fine loaf-sugar with phosphorised æther, and throw it into a basin of water; the surface of the water will become luminous, and show beautifully in the dark; by gently blowing upon it, phosphorescent undulations will be formed, which will illumine the air above the fluid, to a considerable space. In winter, the water must be rendered blood-warm. If the phosphorised æther be applied to the hands, (which may be done with safety,) it will render them luminous in the dark.

## TO SET A MIXTURE ON FIRE WITH WATER.

Pour into a saucer a little sulphuric acid, and place upon it a chip of sodium, which will float and remain uninflamed; but the addition of a drop of water will set it on fire.

## LUMINOUS WRITING IN THE DARK.

Put a small piece of solid phosphorous into a quill, and write with it upon paper; if carried into a dark room, the writing will appear luminous, and have a beautiful effect.

## PERPETUAL MOTION.

Into a basin of clean water, put a few pieces of camphor; they will commence a peculiar motion, traversing every part of the surface of the water, but may instantly be stopped by dropping into the water the minutest quantity of an oily substance.

## ARTIFICIAL PETRIFICATION.

Put into a retort a quantity of pounded fluor spar, and pour upon it some sulphuric acid; fluoric acid gas will be disengaged, holding silex in solution. The subjects that you wish to resemble petrifications must next be moistened with water, and placed in a vessel connected with the neck of the retort. The fluoric acid gas will be absorbed by the moisture adhering to the substances, and the silex will be precipitated upon them like a sort of hoar-frost, which will have a beautiful appearance.

## MINIATURE FIREWORKS.

As the art of making fireworks is replete with danger, even to those who are constantly engaged, and therefore skilful in it, and the letting off the pieces being attended with risk, we think it advisable to omit a description of the methods of manufacturing them; and in lieu thereof to substitute some very interesting chemical experiments, which in their effects bear an affinity to a pyrotechnic display.

**TO CAUSE A REPORT LIKE A GUN, WITH A TOBACCO-PIPE.**—Pulverise singly one ounce of saltpetre, one ounce of cream of tartar, and half an ounce of sulphur, and then mix them together. Put a single grain of this powder into a tobacco-pipe, and when it takes fire, it will produce a very loud report.

**PERCUSSION COMPOSITION.**—A paste, formed of equal parts of chlorate of potass, and sulphuret of antimony, made into pellets of the size of a split pea, will detonate by a smart blow from a hammer on a smooth piece of iron. The percussion-caps used for fowling-pieces are generally charged with this composition.

**INSTANTANEOUS LIGHTS.**—A paste made of eighteen parts chlorate of potass, three of sugar, and three of sulphur, with a little vermilion and gum-water, forms the composition of the instantaneous-light matches, that inflame by being touched with sulphuric acid.

**COLOURED FLAMES.**—The following salts, if finely powdered, and introduced into the exterior flame of a candle, or into the wick of a spirit-lamp, will communicate to flame their peculiar colours :—

|                                |                   |
|--------------------------------|-------------------|
| Muriate of Soda (common salt). | Yellow.           |
| Muriate of Potash.....         | Pale violet.      |
| Muriate of Lime .....          | Brick red.        |
| Muriate of Strontia .....      | Bright crimson.   |
| Muriate of Lithia .....        | Red.              |
| Muriate of Baryta.....         | Pale apple-green. |
| Muriate of Copper.....         | Bluish green.     |
| Borax .....                    | Green.            |
| Chloride of Calcium .....      | Orange.           |
| Nitrate of Copper .....        | Emerald green.    |

The mode of applying these salts is as follows :—Take a piece of packthread, or cotton thread, boil it in clean water to free it from saline particles, and dry it ; wet one end, and take up on it a little of either of the salts above named, in fine powder, or strong solution. Then, dip the wetted end of the thread into the cup of burning wax candle, and apply it to the exterior of the flame, not quite touching the luminous part, but so as to be immersed in the cone of invisible, but intensely heated air which envelopes it. Immediately, an irregular sputtering combustion of the wax on the thread will take place, and the invisible cone of heat will be rendered luminous, with a peculiarly coloured light, according to the salt employed. Or, either of the above salts may be mixed with spirit of wine, and burnt.

**GREEN FIRE.**—A beautiful green fire may be thus made. Take of flour of sulphur, thirteen parts ; nitrate of baryta, seventy-seven ; oxy-muriate of potassa, five ; metallic arsenic, two ; and

charcoal, three. Let the nitrate of baryta be well dried and powdered; then add to it the other ingredients, all finely pulverised, and exceedingly well mixed and rubbed together. Place a portion of the composition in a small tin pan, having a polished reflector fitted to one side, and set light to it; when a splendid green illumination will be the result. By adding a little calamine, it will burn more slowly.

**BRILLIANT RED FIRE.**—Weigh five ounces of dry nitrate of strontia, one ounce and a half of finely-powdered sulphur, five drams of chlorate of potash, and four drams of sulphuret of antimony. Powder the chlorate of potash and the sulphuret of antimony separately in a mortar, and mix them on paper; after which, add them to the other ingredients, previously powdered and mixed. No other kind of mixture than rubbing together on paper is required. For use, mix with a portion of the powder a small quantity of spirit of wine, in a tin pan resembling a cheese-toaster, light the mixture, and it will shed a rich crimson hue: when the fire burns dim and badly, a very small quantity of finely-powdered charcoal, or lamp-black, will revive it.

**PURPLE FIRE.**—Dissolve chloride of lithium in spirit of wine; and when lighted, it will burn with a purplish flame.

**WHITISH-BLUE FIRE.**—Take of nitrate of baryta twenty-seven parts, by weight, of sulphur thirteen, of chloride of potass five, of realgar two, and of charcoal three parts; incorporate them completely, and when inflamed they will emit that peculiar whitish-blue light, accompanied by much smoke, which is employed in fairy scenes at theatres.

**BENGAL LIGHT.**—Mix together sixteen parts of nitre, four of sulphur, and one of orpiment; place it on a tile, and apply a match; it will burn with a bluish flame and diffuse a most intense light.

**SPUR-FIRE** is named from the sparks bearing a great resemblance to the rowel of a spur. It is made of saltpetre, two pounds, sulphur one pound, and lamp-black three quarters of a pound, incorporated thoroughly together; it should then be put into cases about six inches in length, but not driven very hard. This composition is very difficult to mix. The saltpetre and brimstone must be first sifted together, then put into a marble mortar, and the lamp-black added to them; incorporate the ingredients with a wooden pestle, till the mixture appears of a dark gray colour, then drive some into a case for trial, and fire it in a dark place; if the sparks, which are called stars or pinks, come out in clusters, and afterwards spread well without any other sparks, it is a sign of its being good; if any drossy sparks appear, and the stars are imperfect, the composition is not mixed

enough; and if the pinks be very small, and soon break, it is a sign that you have rubbed it too much. This fire has a better effect in a room than in the open air, and may be let off in a chamber without danger: you may hold the cases in your hand while the fire jets out, with as much safety as a candle.

#### PHOSPHORUS LAMP.



Put half a dram of solid phosphorus into a Florence oil-flask, holding the flask slantingly, that the phosphorus may not take fire, and break the glass; pour upon it a gill and a half of water, and place the whole over a tea-kettle lamp, or any common lamp, filled with spirit of wine; light the wick, which should be about half an inch from the flask; and as soon as the water is boiling hot, streams of fire, re-

sembling sky-rockets, will burst at intervals from the water; some particles will also adhere to the sides of the glass, immediately display brilliant rays, and thus continue until the water begins to simmer, when a beautiful imitation of the aurora borealis will commence, and gradually ascend until this collects into a pointed cone at the mouth of the flask: when this has continued for half a minute, blow out the flame of the lamp, and the apex of fire that was formed at the mouth of the flask will rush down, forming beautiful illumined clouds of fire, rolling over each other for some time; and when these disappear, a splendid hemisphere of stars will present itself. After waiting a minute or two, light the lamp again, and nearly the same phenomena will be displayed as from the beginning. Let a repetition of lighting and blowing out the lamp be made for three or four times, so that the number of stars may be increased; and after the third or fourth time of blowing out the lamp, the internal surface of the flask will be dry. Many of the stars will shoot with great splendour from side to side, whilst others will appear and burst at the mouth of the flask. What liquid remains in the flask will serve for the same experiment three or four times, without adding any water. Care should be taken, after the operation is over, to put the flask in a cool and secure place.

#### THE SPECTRAL LAMP.

Mix some common salt with spirit of wine in a platinum or metallic cup; set the cup upon a wire frame over a spirit-lamp,

which should be inclosed on each side, or in a dark lantern: when the cup becomes heated, and the spirit ignited, it will burn with a strong yellow flame; if, however, it should not be perfectly yellow, throw more salt into the cup. The lamp being thus prepared, all other lights should be extinguished, and the yellow lamp introduced, when an appalling change will be exhibited; all the objects in the room will be but of one colour, and the complexions of the several persons, whether old or young, fair or brunette, will be metamorphosed to a ghastly, death-like yellow; whilst the gayest dresses, as the brightest crimson, the choicest lilac, the most vivid blue or green—all will be changed into one monotony of yellow. Each person will be inclined to laugh at his neighbour, himself insensible of being one of the spectral company.

Their astonishment may be heightened by removing the yellow light to one end of the room, and restoring the usual or white light at the other; when one side of each person's dress will resume its original colour, while the other will remain yellow; one cheek may bear the bloom of health, and the other the yellow of jaundice. Or if, when the yellow light only is burning, the white light be introduced within a wire sieve, the company and the objects in the apartment will appear yellow, mottled with white.

Red light may be produced by mixing with the spirit in the cup over the lamp salt of strontian, instead of common salt; and the effect of the white or yellow lights, if introduced through a sieve upon the red light, will be even more striking than the white upon the yellow light.

#### THEATRICAL INCANTATIONS.

DISSOLVE crystals of nitrate of copper in spirit of wine; light the solution, and it will burn with a beautiful emerald-green flame: pieces of sponge soaked in this spirit, lighted and suspended by fine wires over the stage of theatres, produce the lambent green flames now so common in incantation scenes: strips of flannel saturated with it, and applied round copper swords, tridents, &c. produce, when lighted, the flaming swords and fire-forks, brandished by the demons in such scenes: indeed, the chief consumption of nitrate of copper is for these purposes.

#### THE BURNING CIRCLE.

LIGHT a stick, and whirl it round with a rapid motion, when its burning end will produce a complete circle of light, although that end can only be in one part of the circle at the same instant. This is caused by the duration of the impression of light upon

the retina. Another example is, that during the twinkling of the eye we never lose sight of the object we are viewing.

#### SUBSTITUTE FOR A WAX TAPER.

**STEEP** a loosely twisted cotton skein in a solution of nitre; dry it, and it will readily kindle by the sparks produced from the flint and steel. If, however, the cotton be further prepared by coating portions of it, at regular intervals, alternately with sulphur and white wax, and the sparks be struck upon the sulphur, it will readily kindle, and as readily light the wax; and the flame will endure long enough for sealing a letter.

#### TO MAKE PAPER INCOMBUSTIBLE.

**TAKE** a smooth cylindrical piece of metal, about one inch and a half in diameter, and eight inches long; wrap very closely round it a piece of clean writing-paper, then hold the paper in the flame of a spirit-lamp, and it will not take fire; but it may be held there for a considerable time, without being in the least affected by the flame.

#### WATERPROOF PAPER.

**MAKE** a solution of caoutchouc in caoutchoucine; plunge into it, once or twice, unsized paper, and dry it by a gentle heat. It may then be used as writing-paper, and will resist all humidity; and small vessels made of it will even contain water.

#### TO SPIN INDIAN RUBBER.

**DISSOLVE** a small piece of Indian rubber in a little caoutchoucine, and put a drop or two of the solution upon a looking-glass or window-pane; touch it lightly with a dry piece of Indian rubber, quickly draw out a fine thread, which attach to a card, and wind off as silk.

#### CHAMELEON FLOWERS.

**TRIM** a spirit-lamp, add a little salt to the wick, and light it. Set near it a scarlet geranium, and the flower will appear yellow. Purple colours, in the same light, appear blue.

Hold a red rose over the blue flame of a common match, and the colour will be discharged wherever the fume touches the leaves of the flower, so as to render it beautifully variegated, or entirely white. If it be then dipped into water, the redness, after a time, will be restored.

Hold over a lighted match, a purple columbine, or a blue larkspur, and it will change first to pink, and then to black. The

yellow of other flowers, held as above, will continue unchanged. Thus, the purple tint will instantly disappear from a heart's-ease, but the yellow will remain; and the yellow of a wall-flower will continue the same, though the brown streak will be discharged. If a scarlet, crimson, or maroon dahlia be tried, the colour will change to yellow; a fact known to gardeners, who, by this mode, variegated their growing dahlias.

Some flowers which are red, become blue by merely bruising them. Thus, if the petals of the common corn-poppy be rubbed upon white paper, they will stain it purple, which may be made green, by washing it over with a strong solution of potash in water. Put poppy petals into very dilute muriatic acid, and the infusion will be of a florid red colour; by adding a little chalk, it will become of the colour of port wine; and this tint, by the addition of potash, may be changed to green or yellow.



## AMUSEMENTS IN CRYSTALLIZATION.



CRYSTALS OF SNOW MAGNIFIED.

THE phenomena of crystallization, so replete with beauties, and so marvellous in their results, often take place within the reach of our observation, without, however, attracting it, from our ignorance of the circumstance. The substance which in cold and dry winter nights covers the panes of glass within an apartment, and in the morning exhibits various fantastic and elegant ramifications, is the human breath crystallized.\* The

\* On dirty windows in London are seen small tree-like crystallizations: these are produced by the great number of coal-fires in the metropolis,



pellucid and transparent coating which in the depth of winter so elegantly decks the branches of trees and leaves of evergreens, is but crystallized water. The snow which falls and accumulates before our eyes, is a congeries or mass of an immense number of separate and transparent crystals. This fact may easily surprise the young reader, because snow has rather an opaque and feathery appearance than that which crystals generally exhibit; but the reason of this is the accumulated light which each separate crystal reflects to the eye of the observer. When analysed by means of a magnifying glass, these crystals present an endless variety of forms, showing as completely as in the mineral crystals, a system which admits of classification; and, what is more singular, these various forms of crystals fall according to the different degrees of atmospheric temperature; some when it is very cold, some when it is about the freezing point, and others at all intermediate temperatures. These snow crystals are frequently so diminutive in their size as not to exceed the thirty-fifth part of an inch in diameter; yet they present beautiful accuracy of form, proper arrangement of every ramification, and form, in the whole, complete geometrical figures. A representation of some of these exquisite works of Almighty power, we give upon the preceding page.

The following are a few of the many striking "Beauties of Crystallization:"

Dissolve alum in hot water until no more can be dissolved in it; place in it a smooth glass rod and a stick of the same size; next day, the stick will be found covered with crystals, but the glass rod will be free from them: in this case, the crystals cling to the rough surface of the stick, but have no hold upon the smooth surface of the glass rod. But, if the rod be roughened with a file at certain intervals, and then placed in the alum and water, the crystals will adhere to the rough surfaces, and leave the smooth bright and clear.

Tie some threads of lamp-cotton irregularly around a copper wire or glass rod; place it in a hot solution of blue vitriol, strong as above, and the threads will be covered with beautiful blue crystals, while the glass rod will be bare.

Bore a hole through a piece of coke, and suspend it by a string from a stick, placed across a hot solution of alum; it will float; but, as it becomes loaded with crystals, it will sink in the solution according to the length of the string. Gas-coke has mostly a smooth, shining, and almost metallic surface, which the crystals

---

and are sulphate of ammonia, or, at least, sulphite of ammonia, which becomes sulphate by exposure to the air.

will avoid, while they will cling only to the most irregular and porous parts.

If powdered turmeric be added to the hot solution of alum, the crystals will be of a bright yellow; litmus will cause them to be of a bright red; logwood will yield purple; and common writing ink, black; and the more muddy the solution, the finer will be the crystals.

To keep coloured alum crystals from breaking, or losing their colour, place them under a glass shade with a saucer of water; this will preserve the atmosphere moist, and prevent the crystals getting too dry.

If crystals be formed on wire, they will be liable to break off, from the expansion and contraction of the wire by changes of temperature. This and the five previous examples have been selected from a very amusing book, entitled, "Parlour Magic."

Sugar-candy is another familiar example of crystallization: a piece of string is introduced into the syrup, and upon this the crystallization begins.



**ALUM BASKETS.** A common willow or wire basket may be covered with beautiful crystals, by immersing it in a solution of alum prepared for the purpose. The water used for the solution must be twice the quantity required to cover the basket, and sufficient alum put in to make a saturated solution, which you must filter through a piece of brown paper into a saucepan or pipkin. But if you wish the basket to be coloured, the dye must be added to the solution before it is filtered. To produce *Crimson* crystals, use an infusion of madder and cochineal. *Yellow*—Muriate of iron or turmeric. *Black*—Japan ink thickened with gum. *Blue*—A solution of indigo in sulphuric acid. *Pale Blue*—Equal portions of alum and blue vitriol; and to produce *green*, add to these last ingredients a few drops of muriate of iron. Of course, all these colours are more or less deep, according to the quantity of dye employed.

The solution being filtered, boil it gently until half the quantity has been evaporated, then put it into any vessel, in which immerse the basket, and remove it with its contents to a dry place, where it may cool without being disturbed.

It is to be observed that if you use a wire basket, the wire must be filed or covered all over with worsted, as the surface of whatever is encrusted must be equally rough.

**STARLIKE CRYSTALS.** Pour three ounces of diluted nitric acid into a glass vessel, and add to it gradually two ounces of bismuth, broken by a hammer into small pieces. The metal will be attacked with great energy, and nitrate of bismuth will be formed. Crystallize the solution by a gentle heat, and preserve the crystals, which possess great beauty, under a glass.

**BEAUTIFUL GROUPS OF CRYSTALS.** Dissolve in seven different tumblers, each containing warm water, half ounces of sulphates of iron, copper, zinc, soda, alumine, magnesia, and potass. Pour them all, when completely dissolved, into a large evaporating dish of wedgwood ware, and stir the whole with a glass rod; place the dish in a warm place, where it will be free from dust and agitation. When the necessary evaporation has taken place, the whole will shoot out into crystals. These will be interspersed in small groups, and single crystals amongst each other. Their colour and peculiar form of crystallization will distinguish each crystal separately; and the whole, remaining in the respective places where they were deposited, will have a very curious and beautiful appearance.

**METALLIC CRYSTALLIZATION.** Melt a ladleful of bismuth, and let it cool gradually till a thin crust has formed on its surface; then, by means of a pointed iron, make two small opposite apertures through the crust; quickly pour out by one of the openings the fluid portion, as carefully and with as little motion of the mass as possible, whilst the air enters at the other: on removing the upper crust by means of a chisel, when the vessel has become cold, a cup-shaped concavity will appear studded with very brilliant crystals, more or less regular according to the quantity of bismuth employed, the tranquillity and slowness with which it cooled, and the dexterity with which the fluid portion, at the moment it began to harden, was decanted from the crystallized part. The same effect may be produced by fusing the substance in a small crucible which has a hole at its bottom, lightly closed by an iron rod or stopper, which is to be drawn out when the mass begins to congeal: by this means, the superior portion which is fluid, is made to run off, and a cake studded over with crystals is obtained.

**CRYSTALS OF BLUE VITRIOL.** Boil a few copper filings in concentrated sulphuric acid, to which a small portion of nitric acid has been added; when the copper is dissolved, dilute the mixture with a little water, and then leave it where it can cool gradually; If the mixture be then suffered to remain a few hours undisturbed, there will be found at the bottom of the vessel beautiful crystals of blue vitriol, as hard as some minerals.

**CRYSTALLIZATION OF INSECTS. FLOWERS, MOSSES, &c.** The

application of aluminous crystallization to objects of natural history and botany, has opened a wide field of amusement in a subject heretofore possessing little variety; inasmuch, as baskets had been hitherto nearly the only articles subjected to the process of crystallization.

Put eighteen ounces of alum into a quart of water, (keeping the same proportions for a greater or less quantity), and dissolve it by simmering it gently in a close, tinned vessel, over a moderate fire, stirring it frequently with a wooden spoon.

When the solution is completed, it must be poured into a deep glazed jar; as it cools, the subjects intended to be crystallized should be suspended in it by a piece of thread or twine, from a stick laid across the mouth of the jar, where they must be suffered to remain for twenty-four hours. When taken out of the solution, they are to be hung up in a shady, cool situation, till perfectly dry. Care must be taken that the solution be neither too hot nor quite cold; as in the one case the crystals will be very small, and in the other much too large.

The insects adapted for crystallization are spiders, beetles, and grasshoppers; and amongst vegetable productions, the common moss-rose, bunches of hops, ears of corn, the daisy, hyacinth, pink, furze blossoms, lichens, and mosses, are some of the most suitable subjects; the nests of small birds with their eggs, particularly if fastened on the branch of a tree, are exceedingly interesting. It is necessary to observe that much attention must be paid to the deposition of the alum, to see that too great a quantity does not settle upon some parts, and too little upon others.

**MURIATE OF LEAD.**—Melt in the bowl of a tobacco-pipe, or in a small crucible, a mixture of an ounce of litharge of lead, and a dram of pulverised muriate of ammonia; when well incorporated by exposure to a red heat, pour it into a metallic cup, and allow it to cool; the result will be muriate of lead of a bright yellow colour, which, when broken, will discover a most beautiful crystalline appearance.

**CRYSTALS OF GLAUBER SALTS.**—On a solution of common soda, pour, by small quantities at a time, diluted sulphuric acid, until the effervescence ceases; by gently evaporating the solution in a saucer near a fire, crystals of sulphate of soda, (Glauber salt) will be obtained.

**COMMON SALT.**—Mix some muriatic acid with thrice its bulk of water, adding thereto as much soda as it will dissolve; by slowly evaporating the solution before the fire, muriate of soda (common table salt) will be obtained.

**TO MAKE LARGE CRYSTALS.**—The salt to be crystallized, is to be

dissolved in water, and evaporated to such a consistency that it shall crystallize on cooling. Set it by, and when quite cold, pour the liquid part from the mass of crystals at the bottom, and put it into a flat-bottomed vessel; when solitary crystals will form at some distance from each other, and gradually increase in size. Pick out the most regular, put them into another flat-bottomed vessel, a little apart from each other, and pour over them a quantity of fresh solution of the salt evaporated, till it crystallizes on cooling. Change the position of every crystal once at least daily, with a glass rod, so that all the faces may be alternately exposed to the action of the liquid; for the face on which the crystal rests, never receives an increase. By this process, the crystals will gradually augment in size. When they have acquired such a magnitude that their forms can easily be distinguished, choose the most regular, put each separately into a vessel filled with a portion of the same liquid; turn them with a glass rod several times daily, and you may obtain crystals of almost any size desired. Whenever the angles and edges of the crystals become blunt, the liquid must immediately be poured off, and fresh liquid substituted, otherwise the crystal will be infallibly destroyed.

**LEAD TREE.**—Dissolve two drams of acetate of lead in a quart of water, and set it aside for a day or two; decant the clear solution into a large phial, and in the centre suspend a piece of zinc, by means of a silk thread fixed to the cork. If the whole be left undisturbed, the lead will arrange itself around the zinc, in beautiful metallic leaves, resembling a shrub.

**ARBOR DIANÆ, OR SILVER TREE.**—Let six drams of a saturated solution of pure silver in nitric acid, and four drams of a similar solution of mercury in the same acid, be diluted with five ounces of distilled water, and poured into a small decanter or glass phial; then compose an amalgam, by mixing one part of finely divided silver with seven parts of mercury, and place a small lump of it at the bottom of the bottle, which must be kept quite still. In a short time, the surface of the amalgam will be covered with minute filaments of silver; and, after standing about forty-eight hours, the solution will deposit all its silver, in the form of brilliant arborescent crystals, springing like a glittering shrub from the bottom of the vessel.

## OPTICAL AMUSEMENTS.



THE MAGIC LANTERN. PAGE 388.

"Hail, holy LIGHT! Offspring of heaven, first-born,  
 Before the sun,  
 Before the heavens, thou wert; and at the voice  
 Of God, as with a mantle didst invest  
 The rising world of waters dark and deep."

MILTON.

"Oh, what a noble heavenly gift is light!  
 By light, that blessed being, all things live."

SCHILLER'S WILLIAM TELL.

THE branch of natural philosophy denominated OPTICS, treats of the nature of Light; the laws by which, under certain circumstances, it is ruled; and the beautiful effects which it produces. The nature of light has not yet been defined: but, of its principles we know many interesting facts; some few of which are continually displayed in every-day life, whilst most of the others can be proved by very easy experiments. These facts are, its amazing *velocity*; its always moving in *straight* lines; that it may be thrown out of its straight course, and be either

(371)

*reflected or refracted* ; that it is not *white* ; and that it is the cause of *all* colour.

The VELOCITY of LIGHT is truly wonderful ; for, according to the calculations of astronomers, it progresses at the rate of 192,000 miles in a second of time—which, as our youthful readers well know, is nearly the smallest portion of time which can be measured, being but the sixtieth part of a minute : consequently, its fearful rapidity is lost upon us, it being impossible for the imagination, however fertile it may be in forming conceptions of the vast and wonderful, to picture to itself anything like such a degree of swiftness ; for, as Sir John Herschel asks : “ What mere assertion will make any man believe that in the one second of time, in one beat of the pendulum of a clock, a ray of light travels over 192,000 miles ; and would therefore perform the tour of the world in less time than the swiftest runner could make one stride ? ” Experiments have proved the accuracy of this calculation, and therefore the statement can be relied upon.

That LIGHT invariably moves in STRAIGHT LINES, unless some obstacles intervene to throw it out of its course, is a fact easily proved by simple experiment. A bent tube affords a good illustration of this part of optics ; for, on looking into one, we shall find that its shape hinders the straight passage of the light, and consequently, prevents our seeing through it. Another experiment may be made by taking several cards, piercing a small hole in each, and then placing them in a right line one behind the other, when we shall not be able to see through them, unless they be so arranged that the apertures coincide exactly with each other. Another proof that light moves in straight lines, is within the reach of every one's observation : it is, that the shadow from any object or body, when cast upon a plane, or level surface, has a form exactly like the section of the body which throws it ; of the truth of this our readers may satisfy themselves when the sun peeps out, and casts shadows from houses, trees, &c.

The REFLECTION of LIGHT is its being hindered in its outward course, and thrown back in a direction contrary to that which it was originally pursuing : this is caused by its falling upon very smooth and highly-polished surfaces, such as mirrors, whether of looking-glass or metal, whether of plane or flat surfaces, or convex, *i. e.* the surface rounded *outward* ; or concave, or rounded *inward* ; and according to the form of the surface from which the reflection takes place, so is the effect produced. With respect to the two last-mentioned forms of mirrors, there are some effects which invariably occur : these are, that when the rays are reflected from a convex body they *diverge*, that is, the farther they proceed from the body reflecting, the wider they spread ; and when they are reflected from a concave body, they *converge*, or come to a point at a distance from the reflecting object.

LIGHT is REFRACTED, or bent out of its course, when it passes obliquely through a medium of greater density than that through which it has been traversing, so as to fall quite in a different place to what it would have done, had it not passed into that medium; and the amount of this refraction or bending of the light is always governed by its obliquity, and the nature of the substance through which it progresses. There are some substances or media which are of greater density, and refract light better than others: for instance, alcohol refracts light more than water, oil more than alcohol, and glass even more than oil. Amongst the many useful inventions which the progress of civilization and knowledge has brought forward, there are few which are of so much utility as those which depend upon the refractive powers of glass for their effect; and these are the telescope, microscope, camera obscura, magic lantern, &c. &c. The pieces of glass used in these instruments are termed *lenses*, from their being made in the shape of a flat bean or lentil; this shape, from being rounded outward on both sides, forms what is called a convex lens, and in addition, the concave, or *hollow* on both sides, with the various modifications of both kinds of lenses, employed for optical purposes. The convex lenses cause the different rays which pass through them from any given point or object, to bend and unite together again at another point beyond them. The more convex the lens is, the nearer is its focus; for, it has been ascertained that the focus of a doubly convex lens is exactly where the centre of the sphere would be, of which the surface of the lens is a portion; consequently, in proportion to the convexity of the lens, so will the nearness of its focus be, as it then forms a part of a smaller sphere. When the light proceeding from all points of any object placed before a lens, is collected at a certain point beyond it, and received on a white screen or other medium in a darkened room, it produces the well-known effects of the magic lantern, the solar and oxy-hydrogen microscopes, and the camera obscura; and when the image beyond a lens is viewed in the air, in a particular direction, it then shows the disposition of parts which form the telescope, common microscope, &c. The concave lens acts exactly the reverse of the convex: that is, instead of converging the rays to a point, it expands them, and causes them to fill a space considerably larger than the size of the lens itself.

Some of the most striking celestial appearances, and which are of very frequent occurrence, are the result of the reflection and refraction of the rays of light. The serene, mild glow of twilight, which so softly ends the day, and diminishes the transition from the burning glare of the sun to the cold hues of night, is owing to reflection; and so also is that beautiful many-coloured arch, the rainbow. The varied tints of the clouds, from



the gray, pearly, morning dawn, to the brilliant crimson and gold glories of sunset, are produced by a combination of causes—absorption, reflection, and refraction. The deceitful mirage is another effect owing to refraction. It is occasioned by unequal refraction, that is, when the rays of light enter a medium of different densities; and is a phenomenon of rare occurrence in temperate climates, occurring chiefly in those subject to the extremes of temperature, whether of heat or cold. In the arid deserts of Africa, the mirage frequently presents the appearance of a delightful tract of country stretching across the wide plain, in which the traveller fancies he may refresh himself and his camels, sheltered by lofty palm-trees from the scorching rays of the sun; but as the wanderer pursues his onward course, he finds the unsubstantial forms vanish before his eager gaze, making the dreary way still more desolate from the bitterness of disappointment. In the Arctic regions, also, the mirage presents forms of great interest and beauty, but of a different character from those in the torrid zone; displaying lofty towers and pinnacles, high battlemented walls and aerial palaces, from the refracted forms of the icebergs.

It was formerly supposed that SOLAR LIGHT was a WHITE substance; but that opinion has been exploded since Newton discovered, by means of a prism, that light is composed of seven elementary colours—red, orange, yellow, green, blue, indigo, and violet. Dr. Wollaston considered there to be but four primitive colours, red, green, blue, and violet; whilst, according to the analysis of Dr. Young, three only—red, yellow, and blue—can be reckoned; this last opinion is supported by Sir David Brewster, from the results of his own experiments. To our young readers it may seem a startling matter to consider the transparent body called *light* as being composed of seven colours; but if they try the simple and pleasing experiments at page 379, they will find that by decomposing and afterwards re-composing a beam of solar light, that it is by no means that colourless medium they would otherwise be disposed to imagine it.

LIGHT is the cause of all COLOUR; for colour does not belong naturally to any substance, but is entirely regulated by the peculiar rays which the substance reflects and absorbs. Those objects which appear *white* to us, reflect *all* the primitive colours; whilst those which seem black, *absorb all* and *reflect none*; whatever appears *green*, absorbs the red ray, and reflects the *blue* and *yellow* rays only, which, blending together, produce the compound colour *green*. Thus, bodies seem to be of those colours which are formed from the reflected rays; for the reflected elementary rays combining, produce another kind of colour, which is the one our visual organs take cognizance of. The varied colours which we see around us, and the harmonious tints displayed upon every

object within our notice, are produced by combinations of the elementary rays of colour; and are to be accounted for on the principles of reflection, refraction, and absorption.

We shall now proceed to enumerate a few practical illustrations.

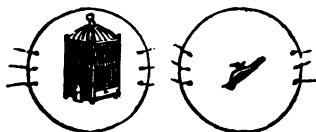
#### OPTICAL AUGMENTATION.

**TAKE** a large conical-shaped drinking-glass, put a shilling into it, and fill it about half-full with water. Place a plate upon the top of the glass, and turn it very quickly over, so that the water may not escape, and a piece of silver as large as half a crown will immediately appear in the plate; whilst, some little way up the glass, another piece will present itself, about the size of a shilling. This effect is caused by refraction.

#### REFRACTION OF LIGHT.

**PUT** a piece of money at the bottom of an empty basin, and then retire a few steps backward, till the edge of the basin screen the money from your sight. Keep your head steady, and request some one to fill the basin very gently with water; as the water rises, the coin will come gradually into view; and when the basin is nearly full of water, it will be completely visible.

#### THE THAUMATROPE, OR WONDER-TURNER.



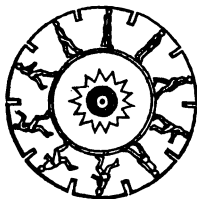
**THE** Thaumatrope is an exceedingly amusing toy, of very simple construction and pleasing effect. It is made in the following manner:—Cut out a piece of card-board of circular

form, and affix to it six pieces of string, three on each side, as delineated in the margin. Paint on one side of the card a bird, and on the other a cage; being careful to draw them upside down to each other, otherwise the desired effect will not be produced. When showing the toy, take hold of the centre strings between the fore-finger and thumb of each hand, close to the card, and twist or twirl the card rapidly round; when lo! the bird will appear snugly ensconced in its cage. The principle on which this pleasing toy acts, is, that the image of any object received on the retina or optic nerve, which is at the back of the eye, is retained in the mind for about eight seconds after the object causing the impression is withdrawn; consequently, the impression of the painting on one side of the card is not obliterated ere the painting on the other side is brought before the eye; it therefore follows that both sides are seen at once. The subjects suited to the Thaumatrope are very varied: amongst

others, the following are well calculated for display; a juggler throwing up two balls may be drawn on one side of a card, and two balls only on the other, and according to the pairs of strings employed, he will seem to toss two, three, or four balls; the body and legs of a man on one side, and his head and arms on the other; a candle and its flame; a mouse and a trap, and a horse and his rider; this last is a very good one, as by using the different pairs of strings, the relative positions of man and horse may be varied most singularly.

#### THE STOBOSCOPE OR PHENAKISTISCOPE.

THIS is a most amusing instrument, and in its principles resembles the Thaumatrope; its effect depending, like that, upon the continuance of the image of an object upon the retina. It consists



of a disc made of stout cardboard, upon which, towards the edge, a series of figures in eight or ten different positions is painted; thus, if it be wished to produce the illusion of a man running, the first position should be quiescent, standing upright, the second advancing forward a little, the third stepping out still more, and so on to the sixth figure, which should be drawn as if running at full speed;

the remaining attitudes should show the person gradually returning to the first quiet attitude. Between each figure, a slit must be made about three quarters of an inch in length, and a quarter, or less, in width; running in a parallel direction with the radii of the disc, and extending to an equal distance from the centre, as in the illustration. This disc when completed should



be put upon a handle as in the annexed figure; Fig. 1 shows a little nut, which must be unscrewed ere the disc can be placed on its axis, and which keeps it in its proper place, so that it cannot lean forward and spoil the experiment; 2 is the disc, and 3 is a nut fixed to the axis by which the rotatory motion is given to the disc. When trying the effect of this instrument, stand before a looking-glass, and hold the painted face of the machine towards the glass; cause it to revolve on its axis, and look through the slits, when instead of beholding a mass of confusion, as might naturally be expected, and as would undoubtedly be the case, were the disc viewed in the ordinary way, the figures will seem to be running as fast as possible, and with very natural movements, their velocity being of course proportioned to the

rate at which the disc is impelled. The number of subjects adapted for this species of exhibition is considerable; and if they be well drawn, they may be made the source of much merriment. Especial care must be taken, when drawing them, to make the figures correspond exactly with each other in shape and depth of tone, as much of the good effect of the display depends upon accuracy in this respect.

## OPTICAL DECEPTIONS.

If two equal cog-wheels be cut out of card-board, placed upon a pin, and wheeled round with equal velocity in opposite directions, instead of producing a hazy tint, as one wheel would do, or even as the two would if revolving in the same direction, there is presented an extraordinary appearance of a fixed wheel. Again, if one move somewhat faster than the other, then the spectral wheel appears to move slowly round; if the cogs be cut slantwise on both wheels, the spectral wheel in like manner exhibits slant cogs; but if one of the wheels be turned so that the cogs shall point in opposite directions, then the spectral wheel has straight cogs. If wheels with radii or arms be viewed when moving, then similar optical deceptions appear; and though the wheels move ever so fast, yet the magic of a fixed wheel will be presented, provided they move with equal velocities. If they overlap each other in a small degree, then very curious lines will be seen.

Perhaps, the most striking deception is the following: A paste-board wheel has a certain number of teeth or cogs at its edge; a little nearer the centre is a series of apertures resembling the cogs in arrangement, but not to the same number; and still nearer the centre is another series of apertures, different in number, and varying from the former. When this wheel is fixed upon an axle, its face held two or three yards from an illuminated mirror, and spun round, the cogs disappear, and a grayish belt, three inches broad, becomes visible; but on looking at the glass through the moving wheel, appearances entirely change; one row of cogs appears as fixed as if the wheel were not moving, while the other two give an opposite result; shifting the eye a little, other and new appearances are produced.

With the two wheels mentioned in the first experiment, if only one be turned in the sunlight, a shadow corresponding to its appearance will be produced; but if both be turned in opposite directions, the shadow is no longer uniform, but has light and dark alternately, and resembles the shadow of a fixed wheel.

Prick a hole in a card with a needle; place the same needle near the eye, in a line with the card-hole, look by daylight at the end of the needle, and it will appear to be behind the card, and reversed.

Prick a hole with a pin in a black card, place it very near the eye, look through it at any small object, and it will appear larger as it is nearer the eye; while, if we observe it without the card, it will appear sensibly of the same magnitude at all parts of the room.

Cut out a disc or circle of pasteboard, and cover it with paper, half green and half black: cause the disc to be rapidly turned round (like the shafts of a toy windmill), and the colours will combine and produce white.

#### COLOURS PRODUCED BY THE UNEQUAL ACTION OF LIGHT UPON THE EYES.

If we hold a slip of white paper vertically, about a foot from the eye, and direct both eyes to an object at some distance beyond it, so as to see the slip of paper double, then, when a candle is brought near the right eye, so as to act strongly upon it, while the left eye is protected from its light, the left-hand slip of paper will be of a tolerably bright *green* colour, while the right-hand slip of paper, seen by the left eye, will be of a red colour. If the one image overlap the other, the colour of the over-lapping parts will be white, arising from a mixture of the complementary red and green. When equal candles are held equally near to each eye, each of the images of the slip of paper is white. If, when the paper is seen red and green by holding the candle to the right eye, we quickly take it to the left eye, we shall find that the left image of the slip of paper gradually changes from *green* to *red*, and the right one from *red* to *green*, both of them having the same tint during the time that the change is going on.

#### THE STANHOPE LENS



Is a very simple, portable, and economical kind of microscope, invented by the late Earl of Stanhope. It is a cylinder of glass, about half an inch in length and a quarter of an inch in diameter, and is generally mounted in white metal, silver, or gold. Both ends are ground convex, one rather more so than the other; and, as its focus does not exceed its length, it is only necessary to put the object to be viewed either upon, or in immediate contact with, the end which has the slighter degree of convexity, to hold the instrument up to the light and look through it, when the object will be seen considerably magnified, to the extent, we believe, of 4096 times; its magnifying power is, therefore, nearly equal to that of many compound microscopes. The animalculæ in stagnant water, the mites in cheese, the farina and delicate leaves of flowers, the beautiful down upon the wings of butterflies and moths, human hair, the hairs of different animals, are amongst

the objects which this lens develops in a lucid manner ; as likewise the exquisitely minute crystallization of salts, if a drop of a solution of a salt be lightly spread over one end of it, and viewed instantaneously ere the moisture evaporates.

#### TO MAKE A PRISM.

PROVIDE two small pieces of window-glass and a lump of wax ; soften and mould the wax, stick the two pieces of glass upon it, so that they meet, as in the cut, where *w* is the wax, *g* and *g* the glasses stuck to it, (Fig. 1.)

Fig. 1.



Fig. 2.



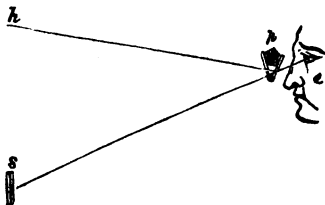
The end view (Fig. 2.) will show the angle, *a*, at which the pieces of glass meet ; into which angle put a drop of water.

To use the instrument thus made, make a small hole, or a narrow horizontal slit, so that you can see the sky through it, when you stand at some distance from it in

the room. Or a piece of pasteboard placed in the upper part of the window-sash, with a slit cut in it, will serve the purpose of the hole in the shutter. The slit should be about one-tenth of an inch wide, and an inch or two long, with even edges. Then hold the prism in your hand, place it close to your eye, and look through the drop of water, when you will see a beautiful train of colours, called a spectrum ; at one end red, at the other violet, and in the middle yellowish green.

The annexed figure 3 will better explain the direction in which

Fig. 3.



to look : here, *e* is the eye of the spectator, *p* is the prism, *h*, the hole in the shutter or pasteboard, *s*, the spectrum. By a little practice, you will soon become accustomed to look in the right direction, and will see the colours very bright and distinct.

By means of this simple contrivance, white light may be analysed and proved to consist of coloured rays, and several of its properties be beautifully illustrated.

#### THE PRISMATIC COLOURS.

OUR young readers will find these three experiments upon the colours in a ray of light, of great interest and beauty.

Close the shutters of a room into which the sun is shining ; and

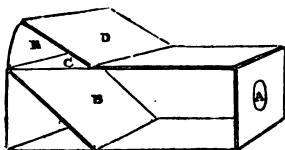
if there be not an aperture in the shutters, then bore a little hole. Hold a prism at a short distance from the aperture, so as to allow the slender stream of sunlight to pass through, and be decomposed by it; when, instead of a little round spot on the opposite wall of the room, an oblong image will be displayed, consisting of the seven colours of the rainbow, red, orange, yellow, green, blue, indigo, and violet. This image is called the solar spectrum.

If the hole in the shutter be exceedingly small, and no prism be employed, then only four colours will be evident, and these are red, green, yellow, and violet.

The above experiments show by decomposition, that light is a compound colour; and to confirm them, it is only necessary to recombine the seven colours, and produce the pure sunlight effect as follows:—

Take another prism corresponding in every respect with the first, and placing them both together, so as to form a parallelogramic figure, the seven rays will be reunited, and form a single spot of light.

#### THE CAMERA OBSCURA.



Provide a box about twelve inches in length, four in depth, and six in width; in the middle of one end of it let a hole be bored, as at A, in the annexed diagram, in which put a doubly convex lens; and at the other end, inside the box, place a piece of looking-glass, as at B, inclining it an angle of  $45^\circ$ , or in less technical phrase, in a position midway between the horizontal and perpendicular, so as to reflect objects upward. Part of the top of the box must be made so as to serve as a lid, upon hinges, as D; and the space beneath be filled up by a piece of ground glass C, upon which medium the objects are reflected from the looking-glass with the utmost exactness and beauty, so as to appear like an exquisite picture in miniature. Sides are usually added to the lid, as at E, to keep off as much of the circumambient light as possible. In some cameras, instead of a fixed lens, a sliding tube, with a lens at the extremity, is employed. The inside of the box should be covered with lamp-black and water, or stained with ink.

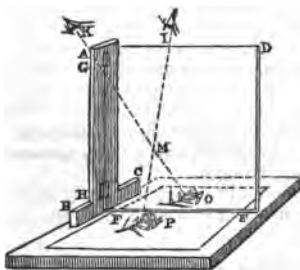
#### THE CAMERA LUCIDA.

The advantage of the camera lucida over the camera obscura is that it presents the objects direct, and without reversal of right and left; but it is by no means an easy instrument to use.

There is what is called a *knack*, which some can acquire, and some cannot : but every one can use the *camera obscura*.

The *camera lucida*, invented by Dr. Wollaston, many years since, may be purchased at any optician's ; but it is somewhat expensive.

A remarkably cheap and easily constructed camera was invented by the late Sir John Robison, which is peculiarly ap-



licable to the delineation of fruits, flowers, bulbs, seeds, and other small objects. The instrument is represented in the annexed figure, and consists of a piece of thin plate-glass, A D F F, set upright on a drawing-board, by means of a wooden standard, A B C, in a groove, in which the edge of the plate is retained by the wedges G and H. The wooden stan-

dard is not fixed to the drawing-board, and may be set on it in any convenient position. To use this apparatus, it is placed in front of the artist, with the standard, A B C, towards him ; the object to be copied is laid on the left-hand side of the plate, as at O ; the head of the observer being also a little to the left of the pillar, and the eye directed towards the middle of the plate, as at M, a distinct image of the object O will be perceived, as if it lay on the paper at P ; and as, at the same time, a pencil held on the right-hand side of the plate will be equally visible, it may be applied to trace the image at P.

Some attention is required in selecting a favourable position for the apparatus, in respect to the illumination of the object, and its admitting only such a degree of light to the paper on the right-hand side of the glass, as may give sufficient distinctness to the point of the pencil, by which precaution the reflected image is seen to most advantage.

It must be recollected, that the delineation will not represent the original object as beheld by direct vision by an eye placed at I, being that of a reflected image, similar to what would be seen by direct vision, if the eye had been situated at K.

#### MULTIPLYING THEATRES.

PLACE in a box two pieces of looking-glass, one at each end, parallel to one another ; and looking over, or by the edge of one



of them, the images of any objects placed on the bottom of the box, will appear continued to a considerable distance.

Or, line each of the four sides of the box with looking-glass, and the bottom of the box will be multiplied to an astonishing extent, there being no other limitation to the number of images but that which is owing to the continued loss of light from reflection. The top of the box may be almost covered with thin canvas, which will admit sufficient light to render the exhibition very distinct.

The above experiments may be made very entertaining, by placing on the bottom of the box some toy, as two persons playing at cards, sentry soldiers, &c.; and, if these be put in motion, by wires attached to them, or passing through the bottom or side of the box, it will afford a still more entertaining spectacle. Or the bottom of the box may be covered with moss, shining pebbles, flowers, &c.; only, in all cases, the upright figures between the pieces of looking-glass should be slender, and not too numerous, else they will obstruct the reflected light.

In a box with six, eight, or more sides, lined with looking-glass, as above, the different objects in it will be multiplied to an almost indefinite extent.

#### THE COSMORAMA, OR SHOW-GLASS.

IMPROVED portable Cosmoramas, complete, may be purchased of any optician; but the ingenious may construct them with little difficulty, if they provide themselves with the glass and prints.

In forming the Cosmorama, place the picture about two inches within the focus of the lens. Then place a piece of scenery about four inches before the marginal parts of the picture, which by scene-painters is called the wings, and may consist of a balcony and a few trees, rocks, &c., according to your taste. This will be similar to the public Cosmoramas; for, by cutting off or hiding the marginal parts of the picture, as above described, the spectator cannot calculate the dimensions of the view.

This, if properly managed, with lights placed behind, and well painted scenery, affords a source of great amusement to young persons. If the bright lights in moonlight subjects be washed over with a composition of equal parts of linseed oil and spirits of turpentine, very pleasing transparencies may be formed.

The Cosmorama may be formed at less expense and trouble than, perhaps, any other public exhibition, while it may be varied to infinity.

It consists merely of a picture, seen through a magnifying-glass, exactly in the same manner as in the common shows exhibited in the streets for the amusement of children; the difference not being in the construction of the apparatus, but in the quality of the pictures exhibited. In the common shows, coarsely coloured prints are sufficiently good; in the Cosmorama, a mode-

ately good oil painting is employed. The construction will be readily understood by the following description. In a hole of a door or partition, insert a doubly-convex lens, having about three feet focus. At a distance from it rather less than the focal distance of the lens, place, in a vertical position, the picture to be represented. The optical part of the exhibition is now complete; but as the frame of the picture would be seen, and thus the illusion be destroyed, it is necessary to place between the lens and the view, a square wooden frame, formed of four short boards. The frame, which is to be painted black; prevents the rays of light passing beyond a certain line, according to its distance from the eye; the width of it is such that upon looking through the lens, the picture is seen as if through an opening, which adds very much to the effect; and if that end of the box, or frame, next the picture, have an edge to it, representing the outlet of a cave, a Gothic ruin, or a rocky archway, which may be partially lighted by the top of the box being semi-transparent, the beauty and apparent reality of the picture will be very much enhanced.

Upon the top of the frame should be placed a lamp. It is this which illuminates the picture, while all extraneous light is carefully excluded by the lamp being contained in a box, open in the front and at the top.

#### OPTICAL INVERSION.

Put a little clear syrup into a square white glass bottle, and then pour into it upon the syrup, about an equal quantity of water. Then place a printed card about an inch behind the bottle, and, if you look through the syrup, or through the water, the letters on the card will appear *erect*; but, when they are seen through that part where the two fluids are gradually mixing together, the letters will appear equally distinct, but *inverted*. A similar effect may be produced with hot and cold water; or even by two portions of cold and heated air. To show the latter, place two chairs back to back, and about a foot apart; connect the tops of the chairs with two pieces of strong wire, and on the wires lay the kitchen poker, the square end of which has been made red-hot. Exactly in the direction of the poker, pin a large printed letter upon the wall, say at about 10 feet distant; then, by looking along the heated poker, you will see *three* images of the letter, the middle one being inverted, and the two others erect.

#### KALEIDOSCOPIC CIRCLES.

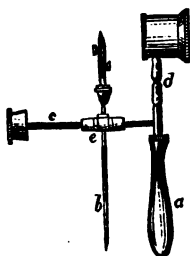
Put on a piece of white paper, a circular piece of blue silk, of about four inches diameter; next, place on the blue silk a circular piece of yellow of three inches diameter; on that, a circle of pink two inches in diameter; on that, a circle of green, one inch in

diameter; then, one of indigo, of half an inch in diameter, and finish by making a small speck of ink in the centre. Place it in the sunshine, look on the central point steadily for a minute or two, and then closing your eyes, and applying your hand at about an inch from them, so as to prevent too much light from passing through the eyelids, you will see the most beautiful circles of colours the imagination can conceive; differing widely from the colours of the silks, and also adding to the richness of the experiment by changing in kaleidoscopic variety.

#### SIMPLE MICROSCOPES.

GET a piece of thin platinum wire, and twist it round the point of a pin, so as to make a very small ring, with a handle to it. Next, break a piece of flint-glass into pieces about the size of mustard-seeds, or somewhat larger; put one of the pieces upon the ring of wire, and hold it in the point of the flame of a candle; when the glass melts, it will become of a completely globular form, and serve, when mounted, every purpose to which microscopes can be applied. The simplest mode of mounting these diminutive lenses, is either to put one between two pieces of brass, which have holes made in them of just the size to retain the edge of the lens; or they may be fastened to a single piece of brass by the aid of a little gum. It is to be observed, that the smaller the drop of glass, the more globular it will remain, and consequently possess greater magnifying power.

#### PORTABLE MICROSCOPE.



THIS cheap and useful instrument consists of a handle of hard wood, *a*, which is screwed into a brass piece, *d*, having, at its top, a ring, with screws on back and front, into which are to be screwed two cells with lenses of different foci. There is also a projecting piece formed on the side of the brass piece, *d*, in which is a hole to receive the screwed end of a cylindrical rod of brass, *c*. Upon this rod a springing slit socket, *e*, slides backward and forward, and is also capable of being turned round. This socket has affixed to it, on one side, a projecting part, with a screwed cavity in it, to receive a short screwed tube, with a small hole in its centre, made to fit the steel stem of the spring forceps; a corresponding hole being made at the bottom of the screwed cavity, where is lodged a piece of perforated cork; which, being pressed upon by the action of the screw, closes upon the steel stem of the forceps, and

steadies them, and the objects held in them. The stem of the forceps being removed from its place in the short tube; the handles and lenses, and the rod, *c*, and the sliding socket upon it, being unscrewed from its place in the handle; they can all three be packed in a black paper case, which is only three and a half inches long, one inch broad, and half an inch thick.

This microscope possesses three different magnifying powers, namely, those of two lenses separately, and the two in combination.

Microscopes of a still simpler nature are small globules of glass formed by smelting the ends of fine threads of glass in the flame of a candle; and small globular microscopes of great magnifying power, made of hollow glass about the size of a small walnut, may be purchased very cheap of the opticians.

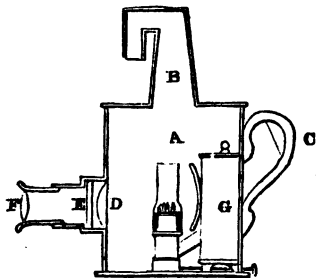
#### WATER LENSES.

TEMPORARY microscopes of considerable distinctness may be very easily made, by piercing a hole about the size of a pin's head in a piece of brass, and carefully placing a minute drop of water on the hole, where it will assume a globular shape. These lenses, as may be imagined, are rendered useless by the slightest movement.

#### AN OPTICAL GAME.

GIVE a ring to a person, or place it at a little distance, in such a position that the plane of it shall be turned towards his face; then desire him to shut one of his eyes, and endeavour to push a crooked stick through the ring; when, to his surprise, he will seldom succeed. The reason is evident: being unaccustomed to use one eye only, he cannot judge of the distance correctly, and, of course, errs; but a person having only one eye, would not fail of achieving the trick.

#### THE MAGIC LANTERN, OR PHANTASMAGORIA.



THE MAGIC LANTERN, one of the most amusing of optical instruments, was invented by Kircher, about the middle of the seventeenth century: it was of the greatest service to the magicians of those times, by enabling them to work upon the credulity of the ignorant and superstitious, with the utmost facility. As a vehicle of amusement, it

contributes in no small degree, in the shape of a gallantee-shew, to the hilarity of a party in a long winter's night; and as a means by which lectures on astronomy can be elucidated, it arrests the attention of graver spectators.

The instrument, the construction of which demands our attention first, is represented in the margin. A, is a box made of wood or tin, about eight inches square, having a bent funnel or chimney, B, at the top; a handle, C, renders it a portable instrument, and holes are made near the bottom to feed the flame of the lamp with the air which is requisite for its combustion; in the front of the box is a tin tube furnished at the end near the light, with a plano-convex lens, D,—which, indeed, is affixed to the lantern itself,—and at the other, a doubly convex lens, F; this tin tube is fixed to the lantern by a square foot, the sides of which are open, as at E, to admit the sliders, and the end of the tube, in which the doubly convex lens is fastened, is made to slide in and out for convenience when adjusting the focus; a third lens is occasionally employed when the space is very confined, as a larger field of view can be obtained by its aid than in the ordinary method. The lamp, G, is a common argand burner, furnished with a concave tin reflector, to concentrate the intensity of the light; and if the lamp be made to slide backward and forward by means of a wire, it will be so much the more useful.

The Phantasmagorial Lantern varies but slightly from the foregoing; the chief points in which it differs being in the form of the tube containing the doubly convex lens, which is made to project further beyond the lens, F; and in the lens itself being contrived so as to move readily backward and forward, either by a rack and pinion, or studs fastened on each side; in a flap to shut off the light abruptly, which may be either a tin slider to run into the groove, or else a piece of tin fastened in the front of all; and in the top of the square chamber, in which the sliders run, being made so as to open occasionally.

**TO PAINT THE SLIDERS.**—The sliders are made of pieces of glass, surrounded by a slight frame, and in dimensions are of course regulated by the depth of the aperture intended for them in the lantern. Few hints can be given for painting them, beyond naming the colours, and the mode of preparing them; as taste is the best guide, and practice the most impressive instructor, in all matters relative to painting. The proper colours are only such as are transparent, and as follow:—Gamboge, scarlet lake, Prussian blue; a green made of distilled verdigris and a quarter of its bulk of gamboge; burnt sienna, burnt timber, and lamp-black. A few implements, such as a glass muller, and slab, which last may

be about six inches square ; a palette-knife, and some small bottles to put the colours in after they are ground ; are also requisite. The colours should be ground up with Canada balsam and turpentine, equal parts of each ; or, if in that proportion they be too thick for grinding freely, rather more turpentine may be added ; thus mixed, they require about a week to dry, and have a very beautiful appearance ; but to have them harden in less time, mastic varnish may be employed instead of the above. When painting, take a very little colour at a time out of the bottles, as it soon hardens ; and if too thick, temper it with turpentine. A piece of glass will serve as a palette, and a bit of stick as a means of getting the colour out of the bottles. The black pigment used in darkening the surface of the glass round the figures of the Phantasmagorical sliders, is composed of lamp-black and asphaltum, dissolved in turpentine.

The subjects intended for the sliders must be carefully drawn upon a piece of paper, which should be placed under the glass, and then painted from ; too much attention cannot be paid to the drawing of the subjects, for when they are thrown upon the wall, all their defects, however minute, are enlarged to an astonishing extent.

Those parts of the subjects which are to appear white, must be left entirely destitute of colour, as flake, and all other whites, are opaque pigments. The mixed colours are produced by blending the colours before-mentioned : thus, greens are made by means of yellow and blue, orange by yellow and carmine, &c. ; this last, although not an exact orange, is near enough for the purpose ; since the red which composes the proper tint, is opaque, and consequently useless. The shadows may be obtained either by stronger tints of the same colours, or by shades of brown or blue, as may be requisite. The sky tints must be darker than they are intended to appear, for as the yellow light of the lamp throws a yellowish tone upon the colours, they would lose their effect were they not so managed ; for the same reason, the green of trees and grass should be painted bluish-green, the reds be but very slightly used, and never shaded with blue ; purples should also be but sparingly employed, for the yellow tone of the lights uniting with the blue and lake colours used in the purple, forms a decidedly neutral tint, or blackish purple, much too dark and unintelligible for the purpose. As it is often necessary to remove some parts which do not harmonise, even after they have well dried, a penknife will be found of great assistance ; when bright lines are required upon a dark ground, the effect is easily managed, by scratching the colour away with a needle, or any other pointed instrument ; and if the lines are to appear faintly coloured, it is only necessary to paint them delicately after the scratching is completed.



The sliders for the common magic lantern are transparent: that is, the figures are painted on a piece of plain glass; whilst, on those used in the phantasmagorial lantern, the figures are surrounded by an opaque black tint, as in the illustrations: the figures of the former are usually shown upon a wall, as represented in the head-piece to this chapter, and invariably have a circle of light around them; whilst those in the latter are thrown upon a semi-transparent screen, which is placed between the spectators and the lantern; and in consequence of no circle of light accompanying them, they have a very beautiful appearance.

Almost magical effects of light, shade, and motion, may be produced by means of different glasses; and the sliders so adapted are termed "movable sliders."

Landscape-glasses are glasses on which several views are painted, divided from each other by some slight foreground object, as a tree, or a building, or guide-post. Various effects, from the brightest mid-day to the deepest tints of night, may be produced in these, by means of double sliders, and these contrivances may be thus applied. Cut away the frame of the slider at each end, nearly even with the glass, and fasten two narrow strips of wood along the glass, one at the top, and the other at the bottom; the piece of glass which is to be moved, should exactly fit the space between the upper and under frames, and act upon the slips; and to keep it steady in its place, two or three pins may be driven into the slips.

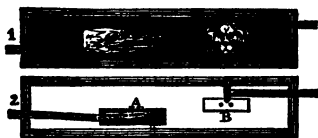
Storm-glasses, which are very ingenious representations of the effects developed by a change from a calm to a thunder storm, require two glasses, as in the former slider. Fig. 1. in the annexed illustration shows a common slider painted at one end to represent a calm of sea and sky, and the sun



setting in splendour; towards the centre the clouds appear threatening, and a gentle undulation of the water breaks its repose; farther on, a still greater agitation of the clouds and water is shown; and at the other end, the lightnings flash, and the sweeping wave tells of the war of elements. The effect is materially

heightened by means of the second slider, fig. 2, having several ships painted on it; and these, of course, must correspond to the action of the water, from the bark sailing in quiet majesty to the tempest-torn and shattered hulk.

The effects of moonlight and sunrise may also be imitated by double sliders; and by a third one, figures may be introduced upon the scenes to add to their beauty.



The eyes and mouths of figures and animals may be made to move, and produce a most singular, nay almost frightful, effect; and by referring to the marginal illustration, the modes by which these

are managed will be clearly understood. In fig. 1 the heads of a crocodile and lion are delineated, and in fig. 2 the contrivances for moving the jaw of the one and the eyes of the other. A, represents a piece of talc having the lower jaw painted upon it and surrounded with black, which fills up a space of corresponding size left blank in the perfect slider; a slight lever should be fastened to this piece of talc, act upon a pivot on the frame, and project a little beyond it; and as it moves up and down, so will the crocodile's mouth appear to open and shut. The eyes of the lion must be painted black upon a transparent piece of talc, as at B, from which a side lever should be carried, as in the former case, to a little beyond the frame; and to prevent the talc from shifting too far either backward or forward, a drop or two of sealing-wax, or a little knob of wood fastened to the glass on each side, either of the talc or lever, will be found sufficient.

**SCREENS FOR THE LANTERN.**—As we before briefly stated that different media were required, on which to show the effects of the Magic-lantern and Phantasmagoria, we must, in concluding this article, give some directions respecting them. Although any white surface will do very well to receive the objects from the Magic-lantern, yet a clean sheet, stretched tightly upon a wall, is by far the best, as the chief point is to have a medium of perfect whiteness and quite flat. The screen for the Phantasmagoria may be made of tissue paper strained upon a frame. Some persons recommend oiled paper as the best medium; but we consider paper so prepared to be too transparent, the plain tissue being thin and translucent enough for any purpose.

Wetted muslin and waxed muslin are also recommended by some persons; but for a screen suited to the pockets of young experimentalists, nothing can be better than the one we recommend; or, for the Phantasmagoria, instead of the figures being reflected



on a white wall, or sheet, as by the magic-lantern, they are thrown on a transparent screen or curtain. The most desirable situation is, where there are folding-doors from one room to another; the curtain should be hung in the doorway, and the spectators placed at the opposite end of the room. The exhibitor, or person who manages the lantern, is then to place himself in the adjoining room behind the curtain; the lantern should be fastened round the waist, so as to leave the hands at liberty; then holding the slide with one hand, he should adjust the tube with the other. He should now go pretty close to the curtain or screen, and draw out the tube until the image is perfect, which of course will be very small; then walking slowly backward, and sliding the tube in at the same time, to keep the image distinct, as it increases in size, it will appear to the spectators on the other side of the screen to be coming towards them; and then again, by the exhibitor walking towards the screen, to diminish the image, it will appear as if the figure was moving backward. Before changing the painting, the darkening door of the lantern may be pushed down, to shut out the light, or the hand may be placed before the lens.

It will also be necessary to observe the following instructions;\*

1. If the lamp do not burn brilliantly, the image will be faint, and very likely the darker parts will not appear at all. The argand lamp must be raised or lowered, so as not to smoke, but to enlighten the field all over, before the slides are put in.

2. If the lenses or the paintings be soiled or dusty, the images will be proportionally faint.

3. In holding the lantern under the arm, or when fastened to the waist, care must be taken to keep it upright, otherwise one side of the figures will be faint, or perhaps disappear altogether.

4. In exhibiting the Phantasmagoria, the spectators should not stand directly before the screen, or they will see the light of the lantern; but they should be stationed a little on one side, and as far off as is convenient.

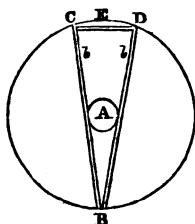
To give motion to the figures, a variety of moveable slides are made for this purpose, many of which produce very singular appearances; but with the plain slides the figures may be made to move in a circular, elliptical, or any other way, by moving the lantern in a corresponding direction, which will of course produce the like motion in the images. A curious effect is produced by drawing out the tube, and slipping it suddenly to the focus. This is easily done: by holding the tube tight at the proper place, a shivering motion may be given to the figures, by giving the lantern a sudden shake, or a skeleton made to tumble to pieces by means of a slide made for that purpose. By standing at the bottom of the stairs, a figure may be made to appear going up.

---

\* By Francis West, Optician, 83, Fleet-street.

The figure of a skeleton is a very good one for this purpose. In the same way, this figure may be made to lie on the floor, and rise up in a sitting or standing position. By applying moveable slides to the lantern, an immense variety of curious effects may be produced, particularly on the transparent screen: many of these are often exhibited in public. Those who take delight in the apparatus will soon be able to produce the whole of them.

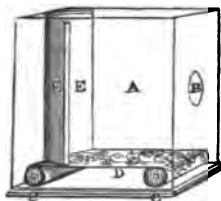
### THE KALEIDOSCOPE.



This intellectual instrument is of modern invention, and forms a toy of exhaustless amusement. Rough, but effective, kaleidoscopes may be purchased for a very moderate price at most toy-shops; but for those of our readers who would like to make them, we proceed to give some information by which they may construct tolerably good specimens for a trifling expense. Get a tube of tin or pasteboard of eight or ten inches in length, and one and a half or two

inches in diameter; have one end stopped up with a piece of tin firmly soldered in, and let there be a slight hole made exactly in the centre of this end-piece. Next, procure two pieces of looking-glass of nearly the length of the tube, for reflectors; but if looking-glass be not easily obtained, strips of good new crown-glass will answer the purpose, if the lower surfaces be blackened with lamp-black or black wax. These plates of glass must be put into the tube in the manner shown at B C, B D, in the marginal figure; they must be quite parallel and close to each other at the lower part B, and kept asunder at the upper part by a piece of cork or any other substance E; the polished sides of the glasses must be uppermost, as at *b b*; A indicates the sight-hole at the farther end, and close to this the reflectors must be fitted. The reflectors being put in, a piece of glass, of the same diameter as the tube, is to be pushed into the tube so as to touch the reflectors; sundry bits of different coloured glass are to be laid on it, a ring of brass or copper placed round its edge, and then another piece of glass, one side of which has been ground with fine emery, laid upon that; the edges of the tin tube are then to be burnished round the last-mentioned piece of glass, by which plan the glasses are firmly secured in their places, and the instrument completed. If a piece of marbled or tinted paper be afterwards nicely pasted over it, the Kaleidoscope will have a very neat and workmanlike appearance.

## THE MYRIAMOSCOPE.



THIS instrument is a variation of the Kaleidoscope, possessing much of the beautiful effect of that pleasing invention, without its liability to be affected by a shake, so as to derange the elegant forms which it produces. A is a square box, in the front of which the sight-hole, B, is made; two rollers, C C, are placed at the bottom of the box; and in order that they may be made to move round with facility, knobs or handles should be fixed to the ends of their axles at the sides of the box. On these rollers, a piece of calico, D, must be wound; and upon it, fanciful borders, flowers, and ornaments; cut out from pieces of paper hangings, must be pasted. Two plane mirrors, E E, joined together by a strip of leather, hinge-fashion, are then to be put on the calico, as shown in the margin; and, of course, all the objects thereon make a very pretty display in the glasses when viewed through the sight-hole, B. The mirrors must be so constructed that they may be put to any inclination, by means of two small pieces of wood fastened to them, and passing through the sides of the box. An opening should be made in the box for the convenience of renewing the subjects, and the top of it be covered with strained muslin, or some other semi-transparent medium.

## CHINESE SHADOWS (OMBRES CHINOISES).



THESE can be best shown in a room which communicates with another apartment by means of folding-doors, so that the spectators may be in one room, and the operator in another. Have a frame of wood made about seven feet in height and four in breadth, as shown at AAA, in the annexed figure; and at B B have two grooves, made in the frame, about two feet apart, taking care that the lowest of them be five feet from the ground; these grooves should be half an inch in width, and an inch in depth, as indicated by the small diagram G, which represents a section of

the frame. Provide also several frames of four feet in width by two in depth, and cover them with white Italian gauze, varnished over with gum copal; on the gauze, then, paint various scenes, buildings, or landscapes, in which the figures are to appear. The woodwork of these gauzed frames must not be more than an inch in depth, nor quite half-an-inch in thickness, in order that they may slide with facility into the grooves, B B. When exhibiting the shadows, the frame A A A, may be supported by slightly nailing the pieces of wood, C C C C, affixed to it for the purpose, to the framework of the door D D D, as shown in the illustration; and the whole of the framework and its supports should be hidden by hanging drapery on the outside, so as completely to screen all movements and the lights in the room, from the spectators, yet not hide the aperture where the shadows are to appear; in the figure above, the drapery is slightly defined, as also a scene on a gauzed frame. Having prepared and painted scenes, next proceed to get the figures ready; they should be made of pasteboard, and that their shadows may have a better effect, the different figures ought to be moveable. To make them act easily, small iron wires must be affixed to their limbs, bent back, and made to terminate in rings, through which rings put the fingers of the right hand, whilst with the left, support the figure by means of another iron wire. By these contrivances, the figures may be made to advance, retire, or gesticulate, without the spectators perceiving the principle on which they act; and as the shadows of the figures are not visible on those parts of the scenes where the colours are dark, they may be held in reserve until the proper time at which they should appear. The painted slides should receive their light from a reverberating lamp, which may be placed about four or five feet from the screen, but so that it is exactly in the centre of the painting.

You must pay particular attention to the carrying on a kind of dialogue, and also to the actions of your figures, to see that they make the corresponding movements of their arms and legs; and it adds materially to the amusement if you can contrive to imitate the shutting of a door, or the sounds uttered by animals, the barking of a dog, crowing of a cock, &c.

#### RAYS OF LIGHT CROSSING EACH OTHER.

MAKE a small hole in a stout piece of pasteboard, and set the piece upright on a table in front of two or three candles placed near together; lay a sheet of paper on the table, and the rays from the different candles passing through the hole, will form as many spots of light as there are candles; each spot being perfect and distinct. This experiment proves that the rays of light do not obstruct each other in their progress, although all cross in passing through the hole.

## ARTIFICIAL RAINBOW.

OBSERVE the various colours which are reflected from the glass drops usually suspended from a lustre or chandelier, and you will witness a mimic rainbow. A rainbow may also be made by a garden engine, if the water be thrown high in the air, and the spectator stand between it and the sun.

## HAND-WRITING UPON THE WALL.

CUT the word or words to be shown, out of a thick card or pasteboard, place it before a lighted lamp, and the writing will be distinctly seen upon the wall of the apartment.

## RINGS OF LIGHT IN CRYSTAL.

THIS is one of the most striking of optical exhibitions, and may be thus simply produced. Provide a sheet of clear ice, about an inch thick, frozen in still weather; let the light fall through the ice upon a pane of window glass, or a polished table, and by placing a fragment of plate-glass near the eye as a reflector, the most beautiful rings of light may be observed.

## LIGHT FROM GILT BUTTONS.

PROVIDE a new and highly-polished gilt button, and hold it in a strong light, closely but obliquely, over a sheet of white paper, when it will present radiations exactly like the spokes of a carriage-wheel; the radiations being sixteen in number, and a little contracted in the centre opposite the eye of the button, and presenting altogether a beautiful appearance.

## BEAUTY OF A SOAP-BUBBLE.

BLOW a soap-bubble, cover it with a clean glass to protect it from the air, and you may observe, after it has grown thin by standing a little, several rings of different colours within each other round the top of it. The colour in the centre of the rings will vary with the thickness; but, as the bubble grows thinner, the rings will spread, the central spot will become white, then bluish, and then black; after which the bubble will burst, from its extreme tenuity at the black spot, where the thickness has been proved not to exceed the  $\frac{2,500,000}{1}$ th part of an inch.

## VISIBLE AND INVISIBLE.

WRITE with French chalk on a looking-glass; wipe it with a handkerchief, and the lines will disappear; breathe on it, and they will re-appear. This alternation will take place for a great number of times, and after the lapse of a considerable period.

## AMUSEMENTS IN ELECTRICITY, GALVANISM, AND MAGNETISM.



THE ORIGIN OF GALVANISM. PAGE 396.

**ELECTRICITY** is one of the most active principles in nature. It exists in all bodies, and is exhibited by various means, one of which, and the most generally employed, is friction : but the bodies rubbed together must consist of different substances ; for, if they are alike, electricity will not be evolved. Some substances, such as soot, charcoal, iron, gold, silver, copper, and other metals, water, &c., are called *good conductors*, because they transfer with great facility to other bodies, the electric fluid which glides over the surfaces with the velocity of light ; whilst others, such as silk, wool, hair, feathers, dry paper, leather, glass, wax, &c., are called *non-conductors*, because they absolutely resist the progress of the fluid, which accumulates all the time the friction continues. It is from these media that are obtained the usual phenomena of electricity, as exhibited in the experiments which

(395)

we shall hereafter describe. Its effects are felt in almost every part of nature: the awful lightning is the exhibition of the electric fluid, which accumulates in the clouds, and which is discharged when the heavy lurid masses come in contact with each other; the mysterious sweeping whirlwind, the terrific rising and rolling of the sand in the desert wilds of Africa, and the beautiful yet evanescent Aurora Borealis of the northern climes; are amongst a few of its effects.

THE next branch of the science of Electricity is GALVANISM, or, as it is sometimes called, Voltaic Electricity; it is obtained through the simple contact of different conducting bodies with each other. It was first discovered at Bologna in the year 1791, by the lady of Louis Galvani, an Italian philosopher of great merit, and professor of anatomy; indeed, from whom the science received its name. His wife being possessed of a penetrating understanding, and passionately loving him, took a lively interest in the science which so much occupied his attention. At the time the incident we are about to narrate took place, she was in a declining state of health, and taking soup made of frogs by way of restorative. Some of these animals, skinned for the purpose, happened to be lying on the table of Galvani's laboratory, where also stood an electrical machine, when the point of a knife was unintentionally brought into contact with the nerves of one of the frog's legs which lay close to the conductor of the machine, and immediately the muscles of the limb were violently agitated. Madame Galvani having observed the phenomenon, instantly informed her husband of it, and this incident led to the experiments and interesting discoveries which will transmit his name to the latest posterity.

The uses of Galvanic Electricity for scientific purposes are incalculable; and its phenomena are so various and extraordinary, as to render the study of this science exceedingly interesting. Through means of a galvanic battery, substances are decomposed, colours changed, water is made inflammable, and motion is given to lifeless bodies.

The experiments we give on galvanism show the effect of the combination which forms what is called a simple galvanic circle, by means of two metals, zinc and silver, or zinc and copper, and water.

Galvanic action is always accompanied by chemical action, and all that is necessary to disturb the galvanic fluid, is to unite two metals together, and subject them to the action of a fluid, which will act chemically upon one of them, differently to what it does upon the other.

A galvanic circle may also be formed of one metal, and two different fluids, which have a different action upon the other.

**MAGNETISM** is a modification of Electricity: at least, there is sufficient evidence that these causes are intimately connected, if not identical; but philosophers are as yet ignorant of its nature.

The property designated by the word Magnetism, is found in an iron ore of a certain composition, and of a dark gray colour and peculiar lustre. This ore alone is the local habitation of Magnetism, whilst all others are subject to its influence, or to be attracted by it. Still, so little difference is there between the Magnetic ore, or loadstone, and those which do not possess the property, that only practised mineralogists can discern one from the other; and an experienced eye may see two ores join each other by the principle of attraction, without knowing in which resides the power, until another ore, non-magnetic, is brought within the sphere of attraction, when it will adhere only to that which contains the principle.

This singular property of the loadstone is imparted to other metallic substances, by rubbing and keeping them close together for some length of time: if the metal be of a hard texture like steel, it retains the magnetic principle permanently; but if soft, it loses the power as soon as separated from the magnet. The metals thus prepared, acquire the same directive and attractive power as the loadstone or natural magnet, and are employed for purposes of the utmost importance.

We proceed to give the youthful amateur the opportunity of exemplifying the principles of Electricity, Galvanism, and Magnetism, by several simple experiments.

#### EXPERIMENTS IN ELECTRICITY.



1.—Lay a watch down upon a table, and on its face balance a tobacco-pipe very carefully. Next take a wine-glass, rub it quickly with a silk handkerchief, and hold it for half a minute

before the fire; then apply it near to the end of the pipe, and the latter, attracted by the electricity evolved by the friction and warmth in the former, will immediately follow it; and by carrying the glass around, always in front of the pipe, the latter will continue its rotatory motion; the watch-glass being the centre or pivot on which it acts.

2.—Warm a glass tube, rub it with a warm flannel, and then bring a downy feather near it. On the first moment of contact, the feather will adhere to the glass, but soon after will fly rapidly from it, and you may drive it about the room by holding the glass



between it and the surrounding objects ; should it, however, come in contact with anything not under the influence of electricity, it will instantly fly back to the glass.

3.—A stick of sealing-wax rubbed against a warm piece of flannel or cloth, acquires the property of attracting light substances, such as small pieces of paper, lint, &c., if instantly applied at the distance of about an inch.

4.—Suspend two small pith balls, by fine silken threads of about six inches in length, in such a manner, that when at rest they may hang in contact with each other ; on applying a piece of sealing-wax, excited as in the former experiment, they will repel each other.

5. Take a piece of common brown paper, about the size of an octavo book, hold it before the fire till quite dry and hot, then draw it briskly under the arm several times, so as to rub it on both sides at once by the coat. The paper will be found so powerfully electrical, that if placed against a wainscotted or papered wall of a room, it will remain there for some minutes without falling.

6.—And if, while the paper adheres to the wall, a light fleecy feather be placed against it, it will be attracted to the paper in the same way as the paper is attracted to the wall.

\* 7.—If the paper be again warmed, and drawn under the arm as before, and hung up by a thread attached to one corner of it, it will hold up several feathers on each side ; should these fall off from different sides at the same time, they will cling together very strongly ; and if after a minute they be all shaken off, they will fly to one another in a very singular manner.

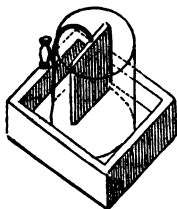
8.—Warm and excite the paper as before, lay it on a table, and place upon it a ball made of elder-pith about the size of a pea ; the ball will immediately run across the paper, and if a needle be pointed towards it, it will again run to another part, and so on for a considerable time.

9.—Support a pane of glass, previously warmed, upon two books, one at each end, and place some bran underneath ; then rub the upper side of the glass with a black silk handkerchief, or a piece of flannel, and the bran will dance up and down under it with much rapidity.

10.—Place your left hand upon the throat of a cat, and, with the middle finger and the thumb, press slightly the bones of the animal's shoulders ; then, if the right hand be gently passed along the back, perceptible shocks of electricity will be felt in the left hand. Shocks may also be obtained by touching the tips

of the ears after rubbing the back. If the colour of the cat be black, and the experiment be made in a dark room, the electric sparks may be very plainly seen. Very distinct charges of electricity may also be obtained by touching the tips of the ears, after applying friction to the back, and the same may be obtained from the foot. Placing the cat on your knees, apply your right hand to the back; the left fore-paw resting on the palm of your left hand, apply the thumb to the upper side of the paw, so as to extend the claws, and by this means, bring your fore-finger into contact with one of the bones of the leg, where it joins the paw; when, from the knob or end of this bone, the finger slightly pressing on it, you may feel distinctly successive shocks, similar to those obtained from the ears. It is, perhaps, unnecessary to add, that, in order to this experiment being conveniently performed, the experimenter must be on good terms with the cat.

#### ELECTROTYPE APPARATUS.



By this simple apparatus may be procured, by galvanic action, perfect fac-similes of engraved copper-plates, however elaborate; also, correct copies of medals, and all kinds of metallic ornaments. The apparatus may be purchased for half-a-crown, or upwards.

It consists of a trough for holding a solution of sulphate of copper, and an inner vessel for the acid and water. The medal to be copied should first be moulded in fusible metal, and a wire attached to the mould to connect with the binding screw. A piece of zinc, amalgamated by washing it with a little dilute sulphuric acid, and rubbing the surface with mercury, is then suspended in the acid by another copper wire, and attached to the binding screw; which, after the lapse of a few hours, will produce a perfect fac-simile of the medal.

To copy copper-plates for printing, as they cannot be moulded, a reverse must first be taken from the plate, and this reversed again, which will produce an exact copy of the original plate.

#### ELECTRICAL SHOCK FROM A SHEET OF PAPER.

PLACE an iron Japanned tea-tray on a dry, clean beaker glass; then take a sheet of foolscap writing-paper, and hold it close to the fire until all its hygrometric moisture is dissipated, but not so as to scorch it; in this state it is one of the finest electrics we have. Hold one end down on a table with the finger and thumb,

and give it about a dozen strokes with a large piece of India rubber from the left to the right, beginning at the top. Now take it up by two of the corners and bring it over the tray, and it will fall down on it like a stone; if one finger be now brought under the tray, a sensible shock will be felt. Now lay a needle on the tray with its point projecting outwards, remove the paper, and a star sign of the negative electricity will be seen; return the paper, and the positive brush will appear. In fact, it forms a very extemporaneous electrophorus, which will give a spark an inch long, and strong enough to set fire to some combustible bodies, and to exhibit all the electric phenomena not requiring coated surfaces. If four beaker glasses are placed on the floor, and a book laid on them, a person may stand on them insulated; if he then holds the tray vertically, the paper will adhere strongly to it, and sparks may be drawn from any part of his body, or he may draw sparks from any other person, as the case may be; or he may set fire to some inflammable bodies by touching them with a piece of ice.

#### LIGHT UNDER WATER.

Rub two pieces of fine lump sugar together in the dark, and a bright electric light will be produced. The same effect, but in a more intense degree, may be produced with two pieces of siler or quartz, the white quartz from the Land's End being best for this purpose. The same effect may also be witnessed by rubbing the pieces of quartz together, *under water*.

#### EXPERIMENTS IN GALVANISM.

1.—PLACE a thin plate of zinc upon the upper surface of the tongue, and a half-crown or a piece of silver, on the under surface. Allow the metals to remain for a little time in contact with the tongue, before they are made to touch each other, that the taste of the metals themselves may not be confounded with the sensation produced by their contact. When the edges of the metals, which project beyond the tongue, are then suffered to touch, a galvanic sensation is produced, which it is difficult accurately to describe.

2.—Place a silver teaspoon as high as possible between the gums and the upper lip, and a piece of zinc between the gums and the under lip. On bringing the extremities of the metals into contact, a very vivid sensation, and an effect like a flash of light across the eyes, will be perceived. It is singular, that this light is equally vivid in the dark and in the strongest light, and whether the eyes be shut or open.

3.—Put a silver cup or mug, filled with water, upon a plate of

zinc on a table, and just touch the water with the tip of the tongue; it will be tasteless so long as the zinc plate is not handled, for the body does not form a voltaic circle with the metals. Moisten your hand well, take hold of the plate of zinc, and touch the water with your tongue, when a very peculiar sensation, and an acid taste, will be immediately experienced.

4.—Take a piece of copper of about six inches in width, and put upon it a piece of zinc of rather smaller dimensions, inserting a piece of cloth, of the same size as the zinc, between them; place a leech upon the piece of zinc, and though there appears nothing to hinder it from crawling away, yet it will not pass from the zinc to the copper; because its damp body acting as a conductor to the fluid disturbed, as soon as it touches the copper it receives a galvanic shock, and of course retires to its resting-place.

5.—Plunge an iron knife into a solution of sulphate of copper, (blue-stone); by chemical action, only, it will become covered with metallic copper. Immerse in the same solution a piece of platinum, taking care not to let it touch the iron, and no deposition of copper will take place upon it; but if the upper ends of the metals be brought into contact with each other, a copious deposition of copper will soon settle upon the platinum likewise.

#### EXPERIMENTS IN MAGNETISM.

1.—We have said that the agency of the Magnet can be imparted to hard metallic bodies; this may be done in a very easy way. If you pass a magnet, (which may be either natural or artificial,) over a sewing-needle several times from the eye to the point, the needle will acquire the principle, and attract iron filings in the same manner as a natural magnet would do. But the part of the magnet which you apply to the needle must be the north pole; and you must not pass it over the needle backward and forward, but lift it always from the point and again begin from the eye. Suppose you wish to impart the principle to a small bar of tempered steel, tie the piece to be magnetised to a poker with a piece of silk, and hold the part of the poker to which it is attached in the left hand; take hold of the tongs, a little below the middle, with the right hand, and rub the steel bar with them, moving the tongs from the bottom to the top, and keeping them steadily in a vertical position all the time. About a dozen strokes on each side will impart sufficient magnetic power to the bar to enable the operator to lift up small pieces of iron and steel with it. The lower end of the bar should be marked before it is fastened to the poker, so that the poles may be readily distinguished from each other when it is taken off; the upper end being the south pole, and the lower the north.



2.—Scatter some iron filings upon a piece of paper, and hold a magnet underneath it. The instant the contact takes place, the filings will raise themselves upright, and fall down as soon as the magnet is withdrawn. The effect is singular, and indeed very amusing; the diminutive iron

particles rising and falling, as if by supernatural agency.

3.—**MAGNETIC SWAN.** Form a swan of cork, and place within its beak a little bit of steel strongly magnetised; then cover it with a thin coating of white wax, and to render the illusion more complete, beads may be put in its head to represent the eyes. The swan being thus made, you must provide it with a lake to swim in. A basin of water may supply this; and when your lake is ready, and the swan placed in it, the next object is to make it swim about. This you may easily accomplish by holding in your hand a magnetic bar, on which the north and south poles are marked. Show the north pole of the wand to the swan, and the little creature will immediately follow it, moving very gently over the water: you may thus lead it about, and when you wish it to retire, present the south pole of the wand to it, and, like an obedient bird, it will readily recede, and turn back.

If you wish to make a magnetic wand, you may do so by procuring a hollow cane, eight or nine inches in length, and half an inch thick, and a small steel bar well magnetised. Put this bar in the cane, and close it at both ends by screwing on small ivory tops, differing in shape, or having some marks by which you may in an instant recognise the north and south ends of the rod. With this wand you may direct the course of any floating figure.

4.—**MAGNETIC ANGLING.** A small piece of wood, with a silken thread attached to it, and an iron hook attached to the other end of the silk thread, will constitute your rod, line, and hook, though a somewhat indifferent-looking apparatus. The hook must be powerfully magnetised, and with it you may easily take the fish, to be bought, not at the fishmonger's, but at the toy-shops. They are made of lead, cast hollow, and very light, with fins and scales, and form altogether very tolerable imitations of fish. In the mouth of each of these little fish, a piece of iron wire, which has been well rubbed with a magnet, is inserted. Throw the fish into a pond, or more properly speaking, basin of water; hold the hook near them, and they will be immediately attracted by its magnetic influence, and ultimately attach themselves to it.

5.—**THE OBEDIENT WATCH.** Conceal in one of your hands a piece of loadstone, and in the other hold a well-going watch. Suppose that your friends are standing around you, to observe the obedience of the watch, hold it close to the ear of the first person, and desire his testimony that the watch is going; then pass it to the hand in which the loadstone is concealed, commanding it to stop, and hold it up to the ear of the next person: having obtained his word that the watch is silent, pass it to the other hand, shake it gently, and again command it to go; and so on, through all the company. The cause of the watch stopping, as you may have guessed, is its coming in contact with the loadstone.

6.—**TO SHOW THE EFFECT OF THE MAGNETICAL AGENCY BY MEANS OF A BALANCE.** Suspend a magnet in one of the scales of a very delicate balance, and carefully adjust it by putting weights into the other scale; when thus counterpoised, hold a piece of iron under the scale to which the magnet is attached, and it will immediately descend. If instead of the magnet, a piece of iron be attached to the scale, and the magnet held under the iron, the scale will descend as before.



7.—**TO SHOW THAT THE POWER OF ATTRACTION RESIDES CHIEFLY AT THE POLES.** Place some iron filings upon a table, and then put amongst them a magnetic

rod or bar. The filings will immediately adhere to the ends of the bar or rod, but not to the middle or centre, where the power of attraction is very little exerted, if at all.

8.—**TO SHOW THE REPULSION OF THE POLES.** The north poles of two magnets repel each other, and the same happens with the south poles, for the magnetic attraction is exerted only between the contrary poles. Thus, if you fix two magnetised needles in two pieces of cork, and place them in a basin of water, and they are in a parallel position with the same poles together, that is north to north, or south to south, they will mutually repel each other; but if the contrary poles point to one another, then they will be attracted and draw close together.

9.—**TO SHOW THE DIRECTIVE POWER OF THE MAGNET.** If you balance a bar of iron, or an untouched needle, horizontally upon a pivot or centre, it will remain stationary; but magnetise the same, place it again on its centre, and you will see that it turns round, and does not stop until its north pole is in the direction of the north pole of the earth.

## CONCLUSION.

THE preceding experiments in Electricity, Galvanism, and Magnetism, we have selected for the simple yet clear expositions which they offer of the fundamental principles of those branches of philosophy ; more elaborate experiments we have refrained from inserting, as although, perhaps, more astonishing and impressive in their effects, the costly and cumbrous apparatus which they require, raise them far above the means of most boys, for whose instruction and amusement we cater.



## TOY BALLOONS.



A **BALLOON** is a thin, light bag of varnished silk, generally shaped like a globe or egg. It is filled with gas, which is much lighter than common air; and it is made large enough that the difference between its weight and that of an equal quantity of common air, may enable it to carry up the silk of which it is constructed, with the persons sitting in the car attached to the balloon. Indeed, a balloon is like a bladder of oil in water, which floats; the oil being lighter than the water, as the gas in the balloon is lighter than the air in which it rises. This explains *why a balloon rises in the air*.

The records of experiments in Aerostation, (as the art of rising in the air in balloons is called,) are very interesting narratives of ingenuity and enterprise, but would be scarcely in place in our little work; since our object is not to teach the young reader to rise in the air in a balloon, but to construct certain *toy balloons*, which may by themselves rise to a considerable altitude.

The superiority of the hydrogen gas over the Montgolfier, or heated air balloon, has long been fully established.

At the present time, balloons are filled with carburetted hydrogen gas (the common coal gas), which is considerably cheaper than the hydrogen, and can be procured far more



readily; inasmuch as the filling of a balloon, which in former periods cost the labour of two or three days, at an enormous expense, can now be done in as many hours. For the discovery of the applicability of this gas to aeronautical purposes, we are indebted to Mr. Charles Green, the intrepid voyager of our own days; and who has also invented what he terms a guide-rope, that is, a rope of a thousand feet in length, and upwards, which when the balloon has quitted *terra firma*, and circumstances render its use advisable, is lowered from the car by means of a windlass.

#### TO CONSTRUCT AIR AND FIRE-BALLOONS.

THE air-balloon should be made of taffeta or lustring, and in shape similar to a pear; indeed, the best method of making it being by joining many slips together, from end to end; if you take a pear and divide it into twelve or fourteen slices, one of those pieces is the best pattern you can have for the shape of the slips of your balloon.

Having cut them out, each piece must be prepared with drying oil, which you may prepare yourself, by boiling in every pint of linseed oil two ounces of sugar of lead, and three ounces of litharge, for about half an hour. This composition is very drying; and you may then apply it to the slips of your balloon; after which sew them together, and fell the seams. That the stitching may not have any interstices for the escape of the gas, you must place a piece of brown paper between each seam, and another piece above; then pass a heated poker or flat iron several times over it, by which means the oil will be softened, and the seams rendered perfectly air-tight. When this process is completed, you must give the balloon a coat of varnish. This may be prepared by boiling in a copper or iron gallon saucepan, over a slow charcoal fire, for about half or three-quarters of an hour, a pound of bird-lime, and half a pint of the drying oil. When the bird-lime has ceased to crackle, pour in two pints and a half more of the drying oil; and let the mixture boil an hour longer, often stirring it with an iron or wooden spoon. You must be cautious not to let the varnish boil over, which it is very apt to do when nearly ready, taking the saucepan from the fire, as the varnish swells, and replacing it when its bubbling subsides; and for greater caution, it will be well to have some wet cloths at hand to place over the vessel, in case the contents should happen to boil over, and take fire. To ascertain whether your varnish is ready, rub some between two knives; if on separating them it forms threads, remove the vessel from the fire, and when nearly cool, add to it about as much of oil of turpentine as the quantity of the mixture within. The varnish must be lukewarm when applied, and the balloon stretched out, and it will be dry in twenty hours.

It should be the aim of the aeronaut to make his miniature balloon as much like a real one as possible: he must make a net to the shape of the machine, so as to come down to about the middle of it, and from thence cords must depend for the purpose of sustaining a light hoop, which should hang a little below the balloon itself; from this hoop, ~~other~~ strings must proceed to support the car, which may be made of any light material, and elegantly painted.

When the balloon is finished, it may be filled with gas; for this purpose, put into a glass bottle, or jar, a pound of iron filings and two quarts of water, to which add gently, and by a little at a time, one pint of sulphuric acid. This done, stop the bottle or jar with a cork; then take a glass tube, introduce one end of it into the bottle, through the cork, and the other end into the neck of the balloon, and the gas resulting from the decomposition of the water, will pass through the glass tube into the balloon. When this is full, withdraw the tube, and tie the neck of the balloon very tight. If let free, it will rise very pleasingly.

In making a fire-balloon, you may use India, bank-post, or tissue paper, and omit entirely the drying oil and varnish. If, after having joined and pasted the seams with good strong paste, you perceive any interstice or hole, pass over it a little piece of paper, and let it dry in the open air, or by the fire, but not too near it. A wire must be secured round the neck of the balloon, either by pasting or sewing it, and another put horizontally across it, to the middle of which a piece of sponge dipped in spirit of wine is to be attached. Half a gill of the spirit is sufficient to make the balloon rise. After you have dipped the sponge, set fire to what spirit remains in the cup, holding the neck of the balloon over it, but not so close as to endanger its safety. When you think it sufficiently filled with heated air, set fire to the sponge, and the machine will briskly ascend, and keep afloat so long as the spirit continues burning.

Very small balloons may be made of gold-beaters' skin, by using gum arabic to join the seams and any little fissures which may be in the material; fill them with gas in a jar or bottle, as before described, and tie the mouths of the little machines with a piece of cotton, to prevent the escape of the gas; small cars may be also attached to them, and when they are let off in a room, they will rise to the ceiling, and remain floating in the air for some time.

One of the simplest and most beautiful experiments in aerostation, is to take a turkey's maw, or stomach, properly prepared, and to fill it either with pure hydrogen gas, or the carburetted hydrogen produced from coal. If the balloon be then allowed to escape in the open air, it will ascend rapidly in the atmosphere: but the best method of showing the experiment, is to let the

balloon off a high staircase, and observe it ascend to the cupola or light, where it will remain near the highest point till the escape of the gas allow it to descend. The prepared maw for this balloon may be purchased of any optician.



PARACHUTES may be made by two methods: the first and simplest is by cutting a piece of tissue paper into a circular form, putting eight or twelve pieces of thread at regular distances, and of equal lengths, to it, drawing them all up evenly to a centre, knotting them together, and completing the apparatus by affixing a cork or a wisp of paper to the end of the string. The second mode of parachute-making is more complex, and must be done on a principle similar to that we have described for constructing the air-balloon, but cutting the slips of silk so as to form, when united, the segment of a circle only; the strings must, of course, be added, and brought to a centre, and a pill-box-shaped car, painted and embellished as tastefully as the genius of the contriver will allow, suspended from the aforesaid centre.

#### INDIA-RUBBER BALLOONS.

Put a little ether into a bottle of caoutchouc, or India-rubber, close it tightly, soak it in hot water, and it will become inflated to a considerable size. These globes may be made so thin as to be transparent.

A piece of caoutchouc, the size of a walnut, has thus been extended to a ball fifteen inches in diameter; and a few years since, a caoutchouc balloon, thus made, escaped from Philadelphia, and was found 130 miles from that city.

#### AIR AND WATER-BALLOON.

Procure a small hollow glass vessel, the shape of a balloon, the lower part of which is open, and place it in water, with the mouth downward, so that the air within prevents the water filling it. Then fill a deep glass jar nearly to the top with water, and place the balloon to float on its surface; tie over the jar with bladder, so as to confine the air between it and the surface of the water. Press the hand on the bladder, when more water will enter the balloon, and it will soon sink to the bottom of the jar; but, on removing your hand, the balloon will again ascend slowly to the surface.



OR

## ARTIFICIAL FIREWORKS.

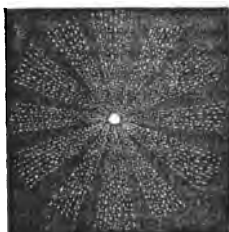
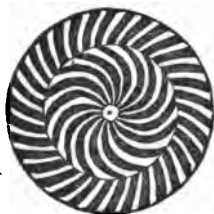
ALTHOUGH we are well aware that letting off fireworks is one of the greatest sources of amusement to youth, yet, as we know accidents, and serious ones too, very often result from the pursuit of such a dangerous pastime, we abstain from describing either the art of making fireworks, or the mode of firing them; preferring to substitute the means of a very ingenious, elegant, and effective display, in the shape of **CHINESE, or ARTIFICIAL FIREWORKS.** For this purpose, have a frame made some three or four feet square, and twelve or fourteen inches deep; let there be a ledge or groove along the bottom in front, and a corresponding one, also in front, at the top, sufficiently wide to slide a picture in. Two wires are to be placed across this frame, each having a loop in its middle, for the purpose of bearing an axle or spindle, which may be made of stout wire. On the front end of this spindle, a wheel, of about two feet in diameter, made of a thin hoop, and six or eight wire spokes, must be fastened, and the other end should have a handle securely fixed on it. The wire wheel must be placed as close to the front as the sliding groove will allow. Next, have as many straining frames prepared, like those made for pictures, as you intend to have subjects; stretch upon them either calico or parchment, or paper, and paint them on both sides with oil

paint, or with lamp-black mixed with water and size. When thoroughly dry, you must proceed to sketch upon them the different designs you wish to exhibit; taking care, if they be intended to appear in motion, that the centres of the pieces correspond with the centre of the wire wheel; then punch an innumerable quantity of holes, of various sizes, to the shapes of the figures, of course having the largest holes and greatest number nearest the centres, from whence the sparks are supposed to jet; and if a few narrow slits be intermingled with the holes, radiating from, and close to the centres of the pieces, much will be gained in their effect. As much is added to the beauty of this species of exhibition, by producing the appearance of various coloured fires, it is as well to paste over the backs of the designs, when punched out, a piece of tissue paper, colouring it according to the nature of the display you intend; either with Prussian blue, carmine, gamboge, a purple composed with carmine and Prussian blue, or a green made with gamboge and Prussian blue, &c. Indeed, any transparent colour, or combination of colours, may be used for the purpose of adding richness and variety to the figures; and if you wish them to be extremely brilliant, either varnish the paper after colouring it, or mix varnish with the colours at first.

As the mere objects themselves in a quiescent state, possess little interest, the means of producing motion next demand our attention. It being necessary to employ three different motions, three hoops must be procured of a size sufficient to fit tightly upon the hoop of the wire wheel; and upon three pieces of blackened paper, of the same kind as that employed on the object frames, the dimensions of the hoops should be sketched. For the first species of motion, that by which a quivering, glittering light is imitated, a wheel of twelve radii or spokes must be drawn upon one of the pieces of paper, as in the annexed figure; and the intervening white spaces cut out with a penknife.



For the second species, producing the effect of fire flowing from a centre, in one uniform motion, the wheel must have a great number of radii flowing in regular curved lines from the centre, as delineated in the illustration; and the white spaces carefully cut out.



For the third motion wheel, the direction of the radii must be varied, by the inner series flowing from the centre in one course; whilst an outer series should proceed in exactly the reverse way, as in the figure; and the white spaces cut out.

After the figures of the motion wheels are properly drawn and cut out on the pieces of paper, they should be pasted upon the hoops prepared for them, and they are then ready for use. The first kind of wheel is adapted for anything requiring a wavering light; the second is exceedingly well calculated for brilliant stars, the sparks from which are to appear as if they were radiating from the centre to the circumference. The third is intended for such pyrotechnic figures and stars as have jets of fire playing from points away from the centre of the piece, as well as those immediately from it: of this kind are the three annexed marginal figures; and the different directions in which the fire will seem to be ejected, particularly if variously coloured fires are imitated, will produce an animated and interesting scene.

A shower of fire requires but little art to imitate it: have a roller fastened at the top of the box, close to the front, and another at the bottom, likewise close to the front; and let there be handles fixed to them: upon these rollers, wind a very long coil of blackened paper, profusely punched with holes of various dimensions; and when, by moving the lower roller, the paper is pulled down and wound upon it, a shower of brilliant sparks will seem to be falling. By reversing the movement of the paper by turning the upper roller, the sparks will then appear

to be moving upward; and if an object frame with a figure like a fountain, be put before it, the effect of a fountain of fire will be very neatly displayed.



If a cone or globe be intended to appear in motion, figures of the annexed shape must be drawn and cut out.

When showing these objects, three or four lamps or candles should be placed along the sides of the frame; and care must be taken that the wheels are not turned too quick, else a haziness will be produced, instead of the tremulous, varying light, necessary for the proper display of the pieces.

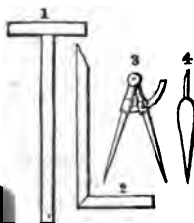
Other and more complicated designs than those we have given will, doubtless, present themselves to the minds of our young readers; and we trust that the really pretty effects which can be obtained in these artificial fireworks, will induce them to lay aside the use of the dangerous real ones.



## MODELLING IN CARD-BOARD.



AMONGST the many in-door pursuits in which lads can indulge, there is not one more interesting and instructive than that of **MODELLING IN CARD-BOARD**; and we flatter ourselves that the following little treatise upon it, will afford much gratification to such of our readers as may happen to have their organs of constructiveness strongly developed.



The implements requisite are not very numerous or expensive: they consist of a brass parallel rule; a flat rule or scale, either of brass or ivory, divided not only into inches, but subdivided into quarter, and half quarter inches; a T square, fig. 1, in the accompanying illustration: a carpenter's square, fig. 2; a pair of compasses with a quadrant, to keep them firm at any opening, fig. 3; compasses, having a moveable leg, with pencil, steel-pen, and knife to fit in, as occasion may require; knives of different

dimensions with fixed blades,—for, as clasp-knives are apt to slip and shut, and thence dangerous, knives of the shape represented in fig. 4 are decidedly preferable; punches of various sizes: brass pins, for securing the bristol board when not strained on the drawing-board; a pair of scissors; a pair of small pincers; one



or two chisels; some wire clamps; and a drawing-board of well-seasoned wood.

**CUTTING THE BRISTOL BOARD.** The bristol board should be secured to the drawing-board, either by passing it down round the edges, or by fixing it down by a brass pin at each corner. After the design is carefully made out, the rule or square must be pressed very firmly and evenly upon it, and the knife carried steadily close to the side of the rule, sloping it a little on one side, so as not to cut perpendicularly down, otherwise the cut will be ragged. In cutting circles, practice alone will make proficiency, as it is a difficult operation; it is better not to cut quite through the bristol board, with the point of the knife, but to finish with the edge of the blade; and even then, it will generally be found necessary to trim or correct the circle, either with the knife or scissors. In cutting by the side of a rule, particular care must be taken not to let the knife slip on to the rule, and spoil the evenness of its line.

#### GLUE, CEMENTS, ETC.

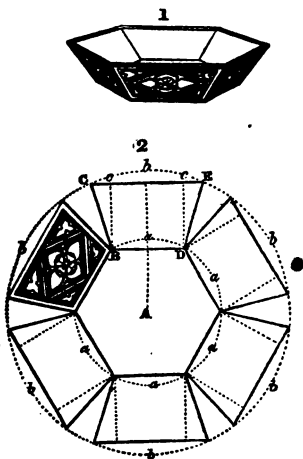
**COMMON GLUE** is frequently employed for fastening the edges of card-board together; but it requires to be used very carefully, otherwise the yellow tint of the glue looks very disagreeable and unworkmanlike. **MOUTH GLUE** is also sometimes used; it is no more than common glue with a little scent in it to take away its disagreeable odour. **RICE GLUE** forms an excellent cement. It is made from rice flour mixed intimately with cold water, and afterwards gently simmered over a fire. It is a durable cement, and if made of a tolerable consistency, small models, bassi-relievi, and busts, may be formed of it, which when dry will take a very high polish. **GUM WATER**, if not too thin, is very serviceable for fastening embossed and gold borders, and other ornaments. **ISINGLASS** dissolved in spirit of wine, with the addition of a small quantity of water, makes a good cement; and it is, we believe, the basis of a cement sold at most chemists', called diamond cement; which, as already prepared and fit for use, it is perhaps better to buy than to make the trouble of manufacturing. If, in the course of his efforts, the young artist need some material which will hold pieces of glass together, **ARMENIAN CEMENT** or **TURKISH GLUE** he will find invaluable; it is made thus: dissolve five or six pieces of gum mastic, each about the size of a large pea, in just enough spirit of wine to render them liquid; and in another vessel, dissolve as much isinglass in French brandy or good rum, as will make a two ounce phial of glue; add two little pieces of gum albanum, or ammoniacum, which should be rubbed until they melt; and then mix the two preparations together with a moderate heat. The glue should be put into a phial, and closely corked; when in use, the phial should be

kept in boiling water. The isinglass must be slightly softened in water, before it is used, but none of the water should be employed. The materials this cement is applied to, should be slightly warmed ere it is put on.

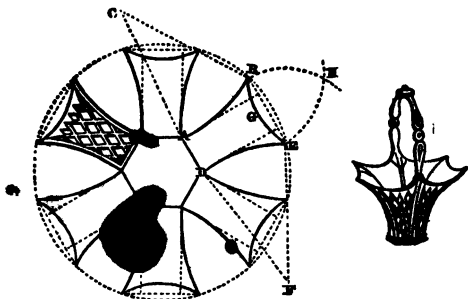
**ORNAMENTS, &c.** Very beautiful patterns of embossed borders, adapted for decorating many little articles, may be purchased at most fancy stationers': they are made in very delicately tinted papers, such as pale yellow, light pink, lavender, and other colours, and add much to the beauty of whatever they are fixed upon. Gold and silver embossed borders, of various breadths and patterns, may likewise be obtained; as also many kinds of gold ornaments, of different sizes. Where neither gold borders or ornaments can be used, the young artificers may call their imaginative powers into requisition in designing ornaments, and gilding them with the gold prepared for using with a paint brush, mixed up in shells and saucers, and to be purchased at the fancy stationers'. In addition to the fancy borders, numberless items in handles for baskets, acanthus leaves for baskets, flowers, &c., are made in embossed work; and afford an immense variety of designs for the ingenious to try their skill upon, in adapting and forming them into elegant ornaments.

#### CARD-BOARD BASKETS.

We shall commence our instructions with some directions respecting the manufacture of baskets in card-board, as they are easy of execution, and form a good prelude to the more difficult subjects; they also afford much scope for the exercise of the fancy, as to the ornamentation on them. In the annexed illustration, fig. 1, is a representation of a regular hexagonal, or six-sided, basket; and in fig. 2, the plan of it is shown. Draw a circle of the dimensions you wish the bottom of your basket to be, as at *a, a, a*, *a, a*, fig. 2, and divide



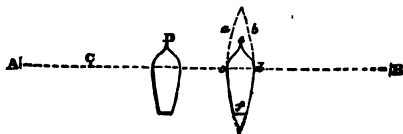
it off into six parts; next make another circle at the intended height of the sides, as  $b, b, b, b, b, b$ , and draw lines through the corners of the opposite sides of the hexagon, as shown by the dotted lines, when the perpendicular form of the sides will be obtained. To give the necessary slant to the sides, a certain measurement must be taken, as  $C, c, c, E$ , on each side of the dotted lines; and the same measurement, to a hair's breadth, must be observed, with all the sides; otherwise, when put together, the inclination of the sides, as at  $B, C, D, E$ , will not correspond so truly as they should do; these lines being adjusted, straight lines must be made on the outer circle, as  $C, E$ , to mark the straight tops of the sides of the basket exactly parallel with the inner hexagon. The outer form of the basket being thus delineated on the card-board, if the young artist wish to make any ornaments upon the sides, he must draw and cut them out carefully, ere he separates the sides from the surrounding board. The ornament shown in our figure is well adapted for this shaped basket: it has a pretty effect when cut through, and a delicately tinted paper put behind it. When detaching the side pieces from the sheet of card-board, and inner hexagon, the operator must be cautious to cut with great steadiness and accuracy; and when joining the sides together, he should use the wire clamps to hold them in their proper places, till the cement is quite dry.



**A BASKET WITH BENT SIDES.** The plan of this basket is similar to that of the former, but, as its sides are curved inward, a different method of shaping them is necessary. After the inner and outer hexagons have been drawn, and the squares of the sides adjusted, to give them the proper degree of curve, put the point of the compasses in  $A$ , afterwards in  $B$ , and draw with the pencil-point

of the compasses two arcs which intersect each other in C; this done, place the compass-point at C, then describe the arc A, B, which will give the necessary curve to one side, and then from the points D, and E, draw two arcs crossing each other at F. From this last point, the arc D, E, may be described; and care must be taken that F is precisely the same distance from D, and E, that C, is from A, and B, otherwise the curve of the sides will not be true. To produce the curved line G, for the top of the side, the compass-point should be put in B, and the arc E, H, described; and afterwards from E, the arc B, H; from this intersecting point the curve G, may then readily be drawn. When one side is cut out, it may be used as a pattern for the remainder. The decorations on the sides we leave to the contrivers, as our illustration shows but a very plain species of ornament. For the handle, an embossed pattern may be used; or if a fantastic shape be preferred, the designer must exert his taste: the handle should be lined with a flattened wire, to give it greater strength; and the same paper as the interior of the basket is papered with, pasted over its under part, to hide the wire.

A BELL-FLOWER SHAPED BASKET is an exceedingly elegant affair. The line A, B, must be drawn upon



the card-board, the point of the compasses placed upon the line at B, and the arc *a* described with the pencil-point of the compasses; the compasses should be kept at the same opening, its point placed at C, and the other arc *b* described when the distance their centres *c* and *d* are apart from each other, determines the breadth, and consequent size, of the leaves. By opening the compasses somewhat wider than from *c* to *d*, from those points you may obtain the extreme point *e* of the leaf; at *f* is shown where the leaf should be cut off at the bottom. At D, the perfect shape of a leaf is given: when one is cut out, it may be employed as a pattern for the other seven, so that the eight leaves may exactly correspond in size. The sides of the little pedestal upon which this basket is to stand, must correspond exactly in breadth with the lower part of the leaves; and the curved base to the whole should be made upon the principle of the basket with bent sides.

## ARCHITECTURAL MODELS.

**ARCHITECTURAL MODELS** are, unquestionably, the most elegant and intricate subjects for card-board work, as they require much ingenuity, care, and perseverance; but when finished, they amply repay any labour which may be bestowed upon them.

For this branch of card modelling, it is necessary to have bristol boards of various thicknesses, some of them little thicker than paper; but they must all be of one colour, as the effect of a little building will be greatly marred if the materials of which it is composed show various tints in its several compartments. As we cannot do more than briefly notice the details of the subjects, and which have been designed expressly for this work, further information upon the names of the different details, and parts of Architecture, by which young aspirants may be guided in their attempts to fabricate temples and mansions, must be gleaned from some elementary works, such as Pinnock's or Lewis's Catechisms of Architecture.

It being impossible, in small card-board models, to define all the divisions of cornices, bases, entablatures, arcades, battlements, pediments, &c., a general idea only can be produced. The long lines of moulding which occur in all buildings, are formed of narrow strips of card, varying in thickness and width, glued to each other, so as to produce the required effect, and then added to the sides of the building; and we would advise the youthful constructor to shape these strips as they may be required,—angular, or rounded,—before he separates them from the larger piece in his hand.

We must premise that the walls of the models should be made of very stout bristol board; and all niches, doors, and windows, drawn and cut out, and the ornamental details on the walls, and in the windows, put on,—together with the talc for the glass, and the mouldings, or other decorations round the upper parts of the windows and building,—previous to erecting. Wherever pillars or buttresses are to be placed, it is advisable to mark the places out carefully, and delicately, with a pencil; as should also the situations of all perpendicular and horizontal mouldings, and other minutiae as cannot conveniently be applied before the walls are joined together.

A **GOTHIC COTTAGE** being a very pretty subject, and tolerably easy, we begin our architectural models with two representations. In one of them, the principal front and entrance are shown. It will be seen that the roof projects considerably beyond the walls, and that a series of small arches are pendant from the eaves; these must be carefully cut out, and adjusted. The slates we would advise to be imitated by pieces of card-board



lapped one over the other, in the manner of real slates; and the same style adopted on a smaller scale on the top of the principal or bay window. All the mouldings round the tops of the windows, technically termed *drip-stones*, must be made of thin card-board, otherwise the shadow will be too strong. The base of the building requires three layers of card-board, so arranged as to form a double



moulding, besides the broad band at the lower part. The pinnacles to the gables or points of the roof and porch must be square, and terminate in a pyramidal form, having at the top of each a little flower-shaped ornament, termed a *finial*. For windows, nothing surpasses a thin plate of talc as an imitation of glass; and we would recommend, instead of using a piece of net for the purpose of denoting the frame-work to the panes of glass, as is generally adopted, that pieces of cotton should be placed diamond-wise, so as to produce a better effect, and less like the partitions of a honey-comb. The door must be deeply recessed, so

as to allow two steps to be put to it; and one step may be outside. The annexed second view shows the back part of the house and the kitchen entrance, where it will be seen shaded by a covering, supported by pillars, and ornamented with a pinnacle at its corner. The chimneys are hexagonal, and are joined together by a narrow



A MANSION forms a beautiful subject: we, therefore, give the accompanying representation of the principal front of a good design. The steps may be made of extra stout bristol board, if the model is not intended to be particularly large. The circular columns are best made of paper rolled so very close and tight, as to be almost solid; the paper must be neatly spread over



with glue, before it is rolled up, so as to prevent the possibility of the pillars losing their shape after they are once made. The

bases are, of course, additional pieces, and may be made of card-board of different thicknesses, to imitate the various depths of mouldings. The capitals are also additional; they should be composed of short rolls of paper of the same diameter as the pillars; and to imitate the effect of the acanthus leaves, which have so beautiful an appearance on this species of capital, small slanting incisions must be made at intervals round them, and the little slices of card thus in some degree detached, turned over outwardly; the curls at the top corners of the capitals, termed *volute*s, are very small rolls of paper fastened on after the leaves are cut and finished. The *cornice*, or moulding round the upper part of the building, the *entablature* immediately below it, and the *architrave*, or part resting upon the pillars, should be composed of various thicknesses of card-board. In the accompanying view, the other, or garden front of the mansion, is represented. It has no steps, portico, or pillars; but, instead, a false pediment supported by three-quarter columns. These latter are easily made, by first forming complete pillars, and then cutting off a





fourth part of each of them. The *flat* pillars, or *pilasters* against the wall, may be composed of extra stout card-board; and the capitals upon the plan we have just described. As the panes of glass in mansions are not usually of a diamond shape, we would advise that the square frames for the glass be cut out of very thin card, so as to produce a neat and delicate appearance; talc must, of course, be used for the glass. The roof, which we have not been able to show in our representations, may rise in the centre, somewhat to the form of the pediment, but not so high, and be tinted of a cool slate colour.

A GOTHIC CHURCH is a splendid but difficult subject to work in card-board. In the annexed illustration, the western front and northern side are seen in perspective. The series of arches A, A, A, A, A, along the upper part of the side walls, and on the front, should be cut out of thin bristol board; to add to their beauty, they may be made of two layers of the board, so as to produce the effect of being ornamented with mouldings round the upper part, in the same manner as the large windows; the same instruction may be applied to the small arches C, decorating the lower story of the front. The buttresses B, B, B, B, B, must be made to project from the sides; to which, indeed, if nicely made, they will prove very strengthening. The doorway, D, should be deeply recessed, and have two or three steps to it; the moulding round the door is highly enriched with knobby ornaments known as *crockets*, and terminated with a finial; the door may be partitioned into panels, as indicated in the illustration, and

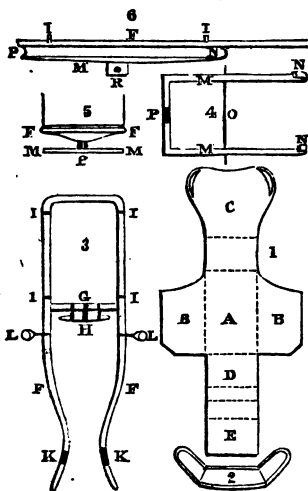
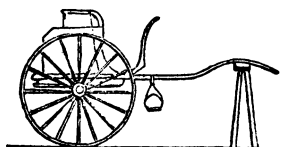
painted to imitate oak.

The windows E, E, in the tower, must not have talc inserted in them, but be made to look as if they had Venetian blinds, by the aid of thin slips of card-board. The parts marked F, F, springing from the corners of the tower to the angles of the belfry, are called *flying buttresses*; and to give them due solidity, they require to be made of tolerably stout card-board; it will be seen that they are orna-



mented with a moulding. The cross, G, at the eastern end, is to

be flat, and of a fanciful or Maltese shape. The roof may be made of two pieces of card, put at the proper slants; and if painted slate-colour they will add much to the beauty of the model. This view of the eastern end shows the principal or oriel window, very highly enriched, and two side ones; and we advise that the talc in these three windows be painted, in imitation of stained glass. The cross, on the apex of the gable is supported by a little piece of decorative work of no great difficulty of execution. The windows in the belfry may have talc put into them, or not, at the option of the constructor. The series of arches at the upper part of the gable, are a continuation of those at the side and front, and must be made in the same way.



GIGS, CARRIAGES, &c. As amongst the various articles boys make out of card-board, there are none more esteemed than GIGS and CARRIAGES, we dedicate a limited space to a notice of the mode of constructing them. The annexed cut shows a side view of a Stanhope, and the following engraving contains a plan of the various details. Fig. 1, represents the plan of the gig; A, is the bottom; B, B, are the two sides; C, the dash-board; D, the back; and E, the piece which bends over to form the angle at the back, and the seat; the dotted lines show where the card is to be cut only half way through, so as to allow the sides and back, and dash-board, to be bent up and put in their proper form, without the trouble of making them of separate pieces of card. Fig. 2, is the seat-rail. Fig. 3, shows the shafts and frame upon which the gig rests; F, F, are the shafts; G, is the bar between the shafts; H,

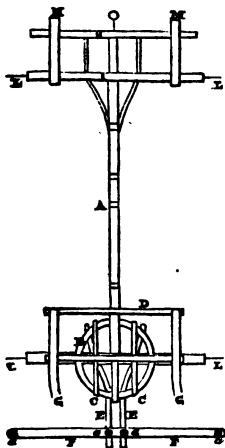
the middle piece; I, I, I, I, little pieces of iron on which the gig rests, and which are more clearly defined in fig. 6; L, L, are the gig steps; K, K, show where the steps are placed, on the under part of the shafts. Fig. 4, represents the springs upon which the shafts rest; these will be better understood by referring to Figs. 5 and 6, in conjunction with it, the letters of reference serving equally for the three figures. M, M, are the springs, which are of the same dimensions as the frame of the shafts, the fore-parts of them turning up as at N, N, to receive the shafts F; at P, the back spring is attached to the spring M, M, and the hinder part of the shaft frame F, F, rests upon it; O, is the axletree, and R, represents a square bit of wood, to be imitated, of course, by a bit of card, through the aperture in which the axle O, passes. The wheels must be cut out of extra-stout card-board; and the stocks or centres of them either made of narrow pieces of card, rolled up closely, in the manner we have described, for the pillars of the mansion, or of bits of a twig of a lilac tree. In some of the little gigs we have examined, the shafts and springs were made of whalebone, with exceedingly smart effect. With careful cutting and scraping for the purpose of rendering it smooth, whalebone is admirably adapted for the shafts and springs; but an impatient workman would scarcely bestow that great care and delicacy in cutting which it requires. Its liability, however, in such small pieces, to fracture perhaps in a direction contrary to that in which it may be required, and thereby cause more work to repair the damage, is a serious drawback. Card-board will serve excellently well for the same purpose, if whalebone be too trying for the patience of the gig-maker.



A CARRIAGE requires much ingenuity and patience, to make it an elegant turn-out. The accompanying engraving gives a faithful

representation of one, drawn to scale, so that our readers may rely upon its proportions being correct. The body of the carriage must, of course, be made of card-board, not, however, on the principle of the gig, as the sides should not be attached to the lower part and back, and merely turned up, but be separate pieces, cemented together when fully cut out; the top, also, must be independent of the back. The wheels, like those of the gig, should be of very thick card. The perch, A, may be of wood or whalebone, as best pleases the modeller, as must likewise the various minutiae of splinter-bar, spring-bed, axle-tree-bed, &c. which we shall more clearly define in a plan. The iron part of the C springs should be imitated by two or three thicknesses of card, tapering off to a thin end, as at B; and the leather straps, c, c, proceeding from the springs, and supporting the carriage, by narrow strips of vellum. The windows, which should be made to slide up and down, may be pieces of talc, fitted into frames of thin card. The lamps require to be cut out of very thin card-board, on account of their diminutive size, and talc will serve as the glass to them also. Were we to give representations of all the details of a carriage, and instructions respecting the making of them, we should wander far beyond our limits, and most probably fail in our purpose of affording instruction, by becoming tedious, as so many parts can be learnt by practice only; and

indeed the outward forms of some of the parts will show how the plans should be arranged; we shall therefore only give a brief description of the annexed engraving, which displays a plan of the details of the carriage.



A, is the perch. The parts connected with the front wheels are termed the fore carriage, and consist of the wheel B; the nunters C, C; the swaybar D; the futchel E, E; and the splinter bar F, F; upon which are four rotabouts, a, a, a, a; the two outside ones are termed foot-steps. G, G, show the places where the C springs are to be planted. The parts between the hind wheels are the spring-bed H; and the axle-tree bed I. L, L, L, L, are the axles of the wheels, and M, M, the places for the hind C springs. Some of these parts we would advise to be made of deal,

and others of card-board, according to the thickness of them

in real equipages, so as to preserve the proportion as nearly as possible.

The materials for lining the gig and carriage must be left to the taste and means of the constructor; fine cloth is usually employed for gigs, and velvet or plush for carriages. The hammer-cloth for the latter may be made of velvet. A little bit of mouse's skin we have seen used as the mat to a gig, and it had a very pretty effect. The brass caps to the stocks of the wheels may be imitated with gold paper, and thin strips of gold paper will also serve to represent the brass work in the other parts of the vehicle.

When the little coach-builder has completed the cutting-out and joining and fitting the parts of his equipages we would counsel him to paint them very nicely, being careful to make the stripes down the spokes of the wheels, along the springs, and in other parts, even and clear, and free from all irregularities of touch; and when the painting is finished, to put the final stroke to his handiworks, by brightening them up with mastich varnish. This operation requires much caution, otherwise, as the varnish settles in a very short time, some parts, especially corners and little crannies, will receive more varnish than they ought, and thence the neatness of the model will be destroyed.

We subjoin tried receipts for glues, paste, &c.

#### MOUTH GLUE, AND JOINING SHEETS OF DRAWING-PAPER.

MOUTH glue is the best substance hitherto known for joining several sheets of paper together, when a single sheet is not of sufficient size to hold the design.

This glue is in fact nothing but the common glue scented, in order to take away the disagreeable smell and taste. For this purpose, 4 oz. of the best English glue is broken to pieces, put into a glazed earthen or stone-ware pipkin, and is floated with cold water: after remaining two or three days, the superfluous water is poured off, and the moistened and softened glue melted on a slow fire: when melted, 2 oz. of common sugar is added by degrees, and some also add a spoonful of lemon-juice—but this appears useless. The melted glue is then poured out on a marble slab, about 18 inches square; or even a wooden slab of the same size, a wall of wax being first made round the slab, and the whole rubbed with a rag well soaked with sweet oil. The mouth glue is left for four or five days to set, or until it can be removed in a cake, which is usually a quarter of an inch thick. After this a napkin, folded in four, is placed on a board, and being put over the glue, the whole is turned, so that the glue may lie upon the napkin; another of which, also folded in four, is warmed and placed on the cake of glue, and on that a board and weight.

The cake is turned several times a day, for a fortnight, and each time covered with a warm napkin. At the expiration of this time it should be sufficiently firm to stand on its edge without bending; but by no means brittle. The greater the weight it is pressed with, the thinner does the cake become. When sufficiently dry, the cake is to be cut with scissors; and the pieces, which are generally three inches long, eight or nine lines wide, and one line thick, are placed on the napkins so as not to touch one another. The use of the weight is to prevent the curling up of the glue as it dries, and the napkins to absorb the oil it takes from the the mould.

The two pieces of paper which are to be joined, are to be cut very straight with a penknife and steel rule; and if the paper is sufficiently thick, both the edges may, by an expert artist, be cut half-way through, so as not to increase the thickness. If this is not the case, the sheets are to be laid so that the slight bur made by the knife may be as little perceived as possible, which is done by putting one sheet with its right face, i. e. that on which the paper-mark is read aright uppermost, and the other sheet with the other face uppermost; then cutting the edge, and afterwards turning them so that both may have their right face uppermost, and with their edges overlapping one another about a line or two, and a slip of paper, also cut very straight, is laid on the under sheet, so as to meet the edge of the upper, as close as possible. Both sheets, and this slip, are kept in their places by rules loaded with weights, and nicks are made on each side to show if any derangement takes place. A piece of the glue, sharpened at the point, being then held in the mouth, between the teeth, for three or four minutes, is to be taken out and rubbed between the edges of the paper, in the middle of the joining, for about the breadth of an inch and a half. This being done as quickly and lightly as the artist can, a piece of paper is put on the joining, and the place is rubbed with an ivory knife, or the handle of an office penknife. A fresh piece on one side of this joining is then glued in the same manner; and then one on the other side, and so on alternately, first one side and then the other, until the whole of the edges are joined. The paper is to be shifted a little on the table each time, that it may not be accidentally glued to it, by the oozing of any part of the glue; and care must be taken that the glue be not rubbed too hard on the paper.

This operation, which requires great neatness, is best done when the sheet which is to be undermost lies next the artist. Many, for fear of having a pucker in the joint, begin at the end next the left hand, and proceed to the right.

#### RICE GLUE.

Mix rice flour intimately with cold water, and gently simmer

it over the fire, when it readily forms a delicate and durable cement, not only answering the purposes of common paste, but admirably adapted to join together paper, card, &c. When made of the consistence of plastic clay, models, busts, basso-relievos, &c., may be formed, and the articles when dry are very like white marble, and will take a high polish, being very durable. In this manner the Chinese and Japanese make many of their domestic idols.

#### PAPER PASTE

Is very similar to the last, but made of white paper, boiled in water for five hours. Then the water being poured off, the pulp is pounded in a Wedgwood mortar, passed through a sieve, and mixed with a little gum-water, or else isinglass glue. Some years since there was at Bath an exhibition called the *Papyrusium*, consisting of some hundreds of beautiful groups of figures and landscapes, made wholly of fine paper paste, by Mrs. Aberdeen, in which the delicate colour and plastic character of the material were finely exemplified. It is used as a modelling material, chiefly to make the finer mouldings and statues in paper architectural models.

#### PAPIER-MACHE

Consists of cuttings of white or brown paper, boiled in water, and beaten in a mortar till they become a kind of paste, and mixed with a solution of gum arabic in size, to give tenacity to them. The pulpy mass thus formed is made into tea-boards, toys, &c., by pressing it into oiled moulds. When dried, it is covered with a mixture of size and lamp-black, and afterwards varnished. It is from this material that the scrolls, wreaths, and rosette ornaments for theatres, decorative cornices, &c., are frequently made, being gilt afterwards. The French, who excel in papier-maché work, are accustomed to make numerous models, painting them with fresco colours — that is, with various pigments mixed with whiting, or some opaque colour. Of this description have been formed models of the chief routes through Switzerland, in which the foundation, or general surface, is of paper, formed irregularly, and coloured to resemble mountains, &c. The glaciers are of coarsely pounded glass — the roads painted brown — the rivers blue — the woods made of the pile of velvet cut off, and the villages of cork.

#### TO MAKE ARTIFICIAL CORALS FOR GROTTOS.

To two drachms of fine vermilion add one ounce of clear resin, and melt them together. Having your branches or twigs peeled and dried, paint them over with this mixture while hot

The black thorn is the best for it. Hold them over a gentle fire, turning them round till they are perfectly covered and smooth. You may make white coral with white lead, and black with lamp-black.

#### COLOURING PRINTS.

THE finest colours for engravings are obtained from flowers; thus, the blue petals of the iris afford a green kind of starch, if they are broken and washed in water; but the finest green is from the ripe berries of the buckthorn. The berries of dwarf elder afford violet, changeable to blue by alum. The currant, cherry, raspberry, madder, and elder, also afford coloured juices: fustic and logwood decoctions are also used.

Our limits warn us that we may not pursue this subject further: we will, therefore, in conclusion, advise our readers to take the utmost care that in their models, the perpendicular and horizontal lines agree, as a tumbling down house would not form a particularly fine specimen of their cunning in building; to be as cleanly when using the glue or cement as they can, for the imprint of a dirty thumb or finger on a neat little cottage, would be very unpleasant to look at; and never to lay aside anything which they may happen to begin, because they cannot perfect it at once, and therefore fancy it is *too hard* for them to accomplish,—for if they do, they may rest assured they will never make anything worth looking at. “Never despair,” must be their motto; for they must not expect that a recreation which requires much practice and much care can be learnt in as short a time as a piece of bread and butter might be eaten.





## CORK MODELS.



**THE** cork, which may be procured at a cork-cutter's at a moderate cost, should be very carefully examined, and only those pieces selected for use which are particularly fine in texture, and free from little knots, holes, and faults.

The only instruments necessary for cutting the cork are penknives, which must be kept exceedingly fine-edged by oft-repeated sharpenings on a German hone, and finishing off on a razor-strap afterwards. This fineness of edge must always be carefully attended to, as cork, when cut with a blunt knife, presents a rough and unsightly appearance.

The cork should be cut into long narrow strips, and then subdivided into little oblong cubes, much care being taken that their sides are strictly parallel to each other. Of course, the size the model is intended to be will regulate the dimensions of the cubes, which, it is needless to say, are to imitate blocks of stone.

The mouldings round doors and windows are usually made of thin strips of cork, glued upon each other, to imitate the different rows of moulding; and these should not be glued to the model till near its completion. The same is to be observed of all ornaments employed.

It is scarcely necessary to observe, that, in using glue, care must be taken that no smear or daub appear conspicuously dis-

played on the little model, as all such glossy patches are exceedingly unornamental and inappropriate.

Moss is often placed on cork models to represent the ivy, and other creeping plants which so luxuriantly adorn ruins; but, in our opinion, it does not improve the appearance of them, the leaves of the moss being much too large in proportion to the little edifices, to produce a pleasing effect.

We would advise such of our readers as may wish to prove their skill in cork modelling to copy prints of ruins, in preference to attempting to group pieces of cork together, and calling such affairs ruins; for the shattered walls and broken pillars in a *real* ruin are infinitely more picturesque in their combinations and forms than in any artificial ones, however cleverly the latter may be designed.

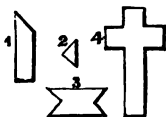




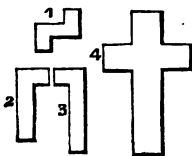
THOUGH in themselves "trifles light as air,"—PUZZLES and PARADOXES are undoubtedly the result of much ingenuity on the part of the contrivers, and certainly the cause of much patient investigation on the part of those who attempt to solve them; and since we have assumed the task of catering for *every* taste, we proceed to lay before our readers a selection of some of the most amusing and intricate puzzles we have been able to gather.

In the arrangement of them, at least of most of them, we have adopted a different system to that usually followed; for, instead of giving the solutions of the puzzles immediately after the propositions, we have classed them under a distinct head, that of "The Key to the Puzzles and Paradoxes;" and we would suggest that our readers should strive to unravel the problems ere they seek the aid of the authentic explanations.

1. How many kings have been crowned in England since the Norman conquest?



2. Cut out of a piece of card, five pieces, similar in shape and size to the annexed figures, viz. one piece of fig. 1, three pieces of fig. 2, and one like fig. 3. These five pieces are then to be so joined as to form a cross, like that represented by fig. 4; but of course larger in size.



3. This is a variation from the preceding puzzle, and is much more complex in its different parts. Cut out of a stiff card three pieces, in shape like fig. 1, and one like fig. 2, and be very careful to make them in exactly the same proportion to each other; next cut out one piece like

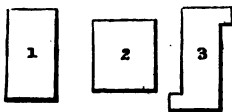
fig. 3, and then endeavour to arrange them so as to form the cross shown in fig. 4.

4. A gentleman sent his servant with a present of nine ducks, in a hamper, to which was affixed the following direction :—

“To Alderman Gobble, with IX ducks.”

The servant, having more ingenuity than honesty, took out three of the ducks, and contrived it so, that the direction on the hamper corresponded with the number of the ducks. As he neither erased any word or letter, nor made a new direction, how did he manage it?

5. Cut twenty triangles out of ten square pieces of wood; mix them together, and request a person to make an exact square with them.



6. A parallelogram, as in the illustration, fig. 1, may be cut into two pieces, so that by shifting the position of the pieces, two other figures may be formed, as shown by figs. 2 and 3.

7. Two men, A and B, went to C, to purchase some spirits. A had a five gallon keg, B a three gallon keg, and C had no other measure than an eight gallon keg; now, as A and B only want four gallons of liquor each, I wish to know if it is possible for C to measure the desired quantity to his two customers, and also how he does it?



8. Cut a piece of apple or turnip into the shape of a horse-shoe, stick six pins in it for nails, and then by two cuts divide it into six parts, each containing one pin.

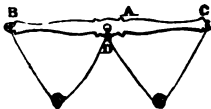
9. Take one from nineteen, the remainder you'll see,  
Is twenty, exactly; pray how can this be?

10. Mathematicians affirm that of all bodies contained under the same superficies, a sphere is the most capacious, but surely they have never considered the amazing capaciousness of a body whose name is now required; and of which it may be truly said, that supposing its greatest breadth is 4 inches, length 9 inches, and depth 3 inches, yet in these dimensions it contains a solid foot.

11. A lady met a gentleman in the street: the gentleman said, “I think I know you;” the lady said he ought, as his mother was her mother's only daughter. What relation was he?

12. If from six you take nine, and from nine you take ten,  
 Ye wits now the puzzle explain ;  
 And if fifty from forty be taken, there then  
 Will just half a dozen remain.
13. Is it possible to place twelve pieces of money in six rows,  
 so as to have four in each row ?

14. **THE BEAD PUZZLE.** This puzzle may be procured at many toy-shops. The part A is made of ivory ; a cord fastened to the end B, is passed through the hole D, in such a manner that it forms a loop there, capable of being drawn out at pleasure, and is afterwards fastened off at C. Two beads are put on the string, as delineated here, and the object of the puzzle is to play both balls on to one string.

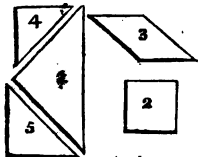


15. **A MAZE OR LABYRINTH.** This maze is a correct ground-

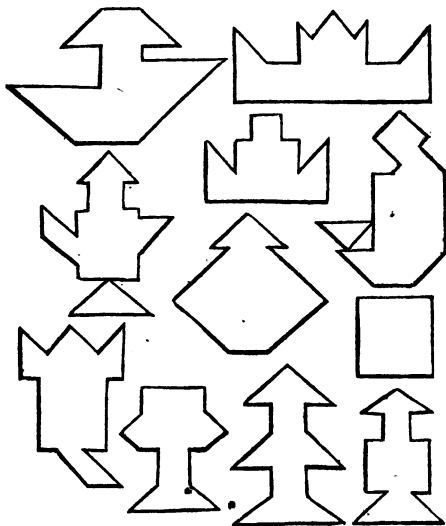


plan of one in the gardens of the Palace of Hampton Court. No legendary tale is attached to it, of which we are aware, but its labyrinthine walks occasion much amusement to the numerous holyday parties who frequent the palace grounds. The partitions between the walks are hedges of clipped hornbeam, and are about five feet in height. The puzzle is to get into the centre, where seats are placed under two lofty trees ; and many are the disappointments experienced before the end is attained : and even then, the trouble is not over, it being quite as difficult to get out as to get in.

16. **THE CHINESE PUZZLE.** This puzzle, being one for the purpose of constructing different figures by arranging variously-shaped pieces of card or wood in certain ways, requires no separate explanation. Cut out of very stiff card-board, or thin mahogany, which is decidedly preferable, seven pieces, in shape like the annexed figures, and bearing the same proportion to



each other; one piece must be made in the shape of figure 1, one of figure 2, and one of figure 3, and two of each of the other figures. The combinations of which these figures are suscepti-



- ble, are almost infinite; and we subjoin a representation of a few of the most curious. It is to be borne in mind, that all the pieces of which the puzzle consists, must be employed to form each figure.

The puzzle may be purchased, very neatly made out of rose-wood, at Mr. Wallis's, Skinner street, Snow Hill, where numerous books, containing figures for this ingenious toy may also be obtained.

**17. THE CIRCASSIAN PUZZLE.** This is decidedly the most interesting puzzle ever invented; it is on the same principle, but composed of many more pieces than the Chinese puzzle, and may consequently be arranged in more intricate figures. Houses, fortifications, monuments, and even perfect geometric forms, are some of the many things which may be imitated with success.

18. **THE MOSAIC PUZZLE** is a very pleasing and ingenious one. It consists of sixty-four small squares, each composed of triangular pieces of white and black wood. Exceedingly pretty and gay imitations of mosaic pavement may be formed by the judicious arrangement of these tesserae, and some very elegant forms have been published in the books which accompany the puzzles. This and the Circassian puzzle are published by Mr. Wallis, Skinner street, Snow-Hill.

THE



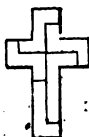
TO THE

## PUZZLES AND PARADOXES.

1. One, only: James I., who was King of Scotland before he ascended the English throne.



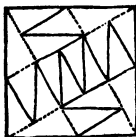
2. A simple inspection of the annexed figure will show how the pieces must be arranged to form the cross.



3. To form this cross, the pieces must be arranged in the manner shown in the annexed representation.

4. The servant merely put the letter S before the two Roman numerals IX. The direction then read as follows :—

" To Alderman Gobble, with SIX ducks."



5. The solution of this puzzle may be easily acquired by observing the dotted lines in the engraving ; by which it will be seen that four triangles are to be placed at the corners, and a small square made in the centre. When this is done, the rest of the square may be quickly formed.



6. Divide the piece of card into five steps, and by shifting the position of the pieces, the desired figures may be obtained.

7. C first filled the three gallon keg out of the eight, and then poured the three gallons into the five-gallon keg ; he next filled the three again out of the eight, and poured two out of the three into the five. He thus filled the five, and left one gallon in the three ; he then emptied the five into the eight, and the one out of the three into the five. He then filled the three again, and poured it to the one in the five, and thus contrived to pour four gallons of liquor into the five gallon keg, and four into the eight, the exact quantity A and B required.

8. By cutting off the upper circular part, containing two of the pins, and by changing the position of the pieces, another cut will divide the horse-shoe into six portions, each containing one pin.

9. XIX make nineteen ; therefore, if you take I away, XX must remain.

10. A Shoe.

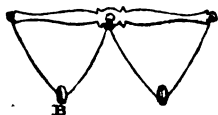
11. Her Son.

12. From SIX take IX, and S }  
       " IX " X, " I } will remain.  
       " XL " L, " X }



13. By forming a figure like the annexed, and putting a piece of money at each angle and each point where the lines intersect each other, the query will be resolved.





14. Draw down the loop, and pass one of the beads (say B) through it. Still holding the ivory in the same position, pull all the strings at the centre hole towards you, till two loops are drawn through; pass the same ball through both of these, and pull the strings back again. It will then be seen that by passing the ball through one remaining loop, it will be brought on to the same string with the other. It may be played back again, in a precisely similar manner.

#### THE MYSTERIOUS CIRCLES.

Cut from a card two discs or circular pieces, about two inches in diameter. In the centre of one of them make a hole, into which put the tube of a common quill, one end being even with the surface of the card. Make the other piece a little convex, and lay its centre over the end of the quill, with the concave side of the card downwards, the centre or upper card being from one-eighth to one-fourth of an inch above the end of the quill—attempt to blow off the upper end by blowing through the quill, and it will be found impossible.

If, however, the edges of the two cards be made to fit each other very accurately, the upper card will move and sometimes it will be thrown off; but when the edges of the cards are, on two sides, sufficiently far apart to permit the air to escape, the loose card will retain its position, even when the current of air sent against it be strong. The experiment will succeed equally well, whether the current of air be made from the mouth or from a pair of bellows. When the quill fits the card rather loosely, a comparatively light puff will throw both cards three or four feet in height. When, from the humidity of the breath, the upper surface of the perforated card has a little expanded, and the two opposite sides are somewhat depressed, those depressed sides may be seen distinctly to rise and approach the upper card, directly in proportion to the force of the current of air.

Another fact to be shown with this simple apparatus, appears equally inexplicable with the former. Lay the loose card upon the hand with the concave side up; blow forcibly through the tube, and, at the same time, bring the two cards towards each other; when within three-eighths of an inch, if the current of air be strong, the loose card will suddenly rise, and adhere to the perforated card. If the card through which the quill passes has several holes made in it, the loose card may be instantly thrown off with the least puff of air.

For the explanation of the above phenomenon, a gold medal

and one hundred guineas were offered, some years since, by the Royal Society. Such explanation has been given by Dr. Robert Hare, of the United States of America, and is as follows:—

Supposing the diameters of the discs of card to be to that of the hole as 8 to 1, the area of the former to the latter must be as 64 to 1. Hence, if the discs were to be separated (their surfaces remaining parallel) with a velocity as great as that of the air blast, a column of air must, meantime, be interposed, 64 times greater than that which would escape from the tube during the interim; consequently, if all the air necessary to preserve the balance be supplied from the tube, the discs must be separated with a velocity as much less than that of the blast, as the column required between them is greater than that yielded by the tube; and yet the air cannot be supplied from any other source, unless a deficit of pressure be created between the discs, unfavourable to their separation.

It follows, then, that, under the circumstances in question, the discs cannot be made to move asunder with a velocity greater than one sixty-fourth of that of the blast. Of course all the force of the current of air through the tube will be expended on the moveable disc, and the thin ring of air, which exists round the orifice between the discs; and since the moveable discs can only move with one sixty-fourth the velocity of the blast, the ring of air in the interstice must experience nearly all the force of the jet, and must be driven outwards, the blast following it, in various currents, radiating from the common centre of the tube and discs.

#### EASIER TO CARRY TWO WEIGHTS THAN ONE.

A boy carries a single dumb-bell with difficulty, owing to his body being overbalanced, and he stretches out the opposite arm to bring himself again upright. But, two bells, one in each hand, are carried with much greater ease, because they balance each other.

#### TWO SOUNDS AT ONCE FROM THE SAME MOUTH.

THE power of producing two simultaneous sounds from the mouth has been strikingly shown by the experimenter whistling airs, first as solos, and then as duets. It appeared that, at the time, the mouth was divided into two parts by the tongue, and that each portion of air was thrown into a separate state of vibration by the embouchure formed at the mouth.

## THE DEAF AND DUMB ALPHABET.



PETER PONCE, THE FIRST TEACHER OF THE DEAF AND DUMB, INSTRUCTING A BOY.

AMONGST the many useful inventions which have been planned for the solace of individuals deprived of some portion of their senses, the art by which DEAF and DUMB persons are taught to express their own thoughts, and to comprehend those of others, is one of the most noble. The earliest attempt at a method of teaching the deaf and dumb was made in Spain, towards the end of the sixteenth century, by a Benedictine monk, named Peter Ponce; and, without doubt, he must have formed his idea from observing the natural propensity of the dumb to supply the want of the organs of speech by making signs. After the essay of Peter Ponce, many successful trials were made, and in 1692, John Conrad Amman, a Swiss Physician, reduced the plans to a fixed method, or art, and published the scheme of it at Amstelod. The first asylum for the deaf and dumb, in London, was founded in the year 1792.

### THE ALPHABET.



A is expressed by touching the top of the thumb of the left hand, with the forefinger of the right.



B. Join the forefinger and thumb of each hand, and place the backs of the forefinger nails together.



C. Bend the fingers and thumb of the left hand, so as to form three parts of a circle.



D. Bend the fingers and thumb of the right hand into a semi-circle, and then join them to the forefinger of the left, which keep in a straight line.



E. Touch the top of the forefinger of the left hand with the forefinger of the right.



F. Place the forefinger of the right hand across the backs of the first and second fingers of the left.



G. Clench both hands, and put one fist upon the other.



H. Pass the palm of the right hand across that of the left, sweeping it along to the tips of the fingers, as if brushing something off.



I. Touch the top of the second finger of the left hand with the forefinger of the right.



J. Clench the hands together, as directed for the letter G.



**K.** Form a semi-circle with the thumb and forefinger of the right hand, and join it to the forefinger of the left, which must be kept straight out, both forefingers must meet at the second joints.



**L.** Place the forefinger of the right hand across the centre of the palm of the left, so that the top of the finger may be exactly in the middle of the palm.



**M.** Place three fingers of the right hand flat upon the palm of the left.



**N.** Place two fingers of the right hand flat upon the palm of the left.



**O.** Touch the top of the third finger of the left hand with the forefinger of the right.



**P.** Place the tops of the forefinger and thumb of the left hand in a semi-circular form against the first and second joints of the forefinger of the right, which should be kept straight.



**Q.** Form a circle with the forefinger and thumb of the left hand, and then curve the forefinger of the right into the shape of a hook, and place it exactly where the other fingers join.



**R.** Bend the forefinger of the right hand and rest it on the palm of the left.



S. Bend the little finger of each hand and lock them together.



T. Fix the tip of the forefinger of the right hand against the middle of the lower edge of the left.



U. Touch the top of the little finger of the left hand with the forefinger of the right.



V. Place the first and second fingers of the right hand apart, upon the palm of the left.



W. Lock the fingers of one hand between those of the other.



X. Cross the forefingers at the second joints.



Y. Extend the thumb and forefinger of the left hand, and at the lower part of the fork so made place the forefinger of the right hand.



Z. Elevate one hand towards the face, and rest the elbow upon the palm of the other.

The end of every sentence is indicated by snapping the second finger and thumb of the right hand. This is requisite to avoid the confusion which might result from running the sentences into each other.

#### THE NUMBERS

Are denoted by holding up one finger to signify 1, two fingers for 2, the open hand for 5, both hands for 10, and so on.

#### MORA.

THE game of Mora—or, as it was generally termed, Miciare Digitis, or Miciare, from whence came Micatura, and, by corruption, Mourre (the French word for it) and Mora—is of great antiquity; its invention was ascribed to Helen, who, it is said, was accustomed to play with Paris, the son of Priam. The game may be played by two or four persons, and usually consists of six points; but this is arbitrary, and left to the arrangement of the players, who then present as many fingers as they choose, calling aloud some particular number; and if either of the numbers thus mentioned agree with the amount of fingers presented, he who named it counts one towards his game, by holding up a finger of the left hand, or, sometimes, a fist or elbow. But neither player is permitted to count, if, on the contrary, both numbers are incorrect. When a player exclaims *tutta* (all), he must display his open hand, and the point is won, if his rival at the same time exhibit all his fingers. Mora Mutola, or Dumb Mora, is played in like manner, but with this exception, that, instead of calling the numbers, the players, before they commence the game, agree by what mode they shall designate odd and even; after which, whoever utters a syllable incurs a forfeit. Should any difficulty arise during the progress of the game, no words are allowed, but the required explanation must be given and received by signs. The Spartan women were reputed very skilful at this game. Cicero had a saying concerning it, when remarking of a man whose honesty was unimpeachable, that grew into a proverb, *Dignus est quicum in tenebris Micas*,—"He is so honest, that you might play Mora with him in the dark;" as much as to say, He will honourably confess how many fingers he presented.



## ENIGMAS, RIDDLES, ETC.

THE ancients believed that the monster Sphynx was the inventor of riddles. The one she proposed for solution was this:—  
 “What animal is that which goes upon four legs in the morning,—upon two at noon,—and upon three at night?” Many persons strove to explain it, but failed, and were torn to pieces by her; at length, Œpidus, the son of Laius, king of Thebes, solved it, by saying that the animal was a man, who in the infancy or morning of his life creeps upon his hands and feet, and so goes on all-fours; in the noon of his life, walks on two feet; and in the waning evening and night of old age, requires a stick, and so totters upon three legs. The Sphynx, enraged at the discovery of her riddle, threw herself from a rock and died.

Such is the *fabled* history of the first riddle; the *true* is not known, as riddles are of remote antiquity; but we find from Plutarch, that, in his days, the Greek girls often amused themselves with proposing riddles for their companions to unravel. For a party of merry roysterers clustered round a cheerful fire, no amusement is better calculated than a batch of enigmas and riddles; as they possess enough point to rivet the attention of all to their probable meaning, and sufficient humour to provoke many a hearty laugh.

### ENIGMAS.

1. 'Twas whispered in heaven, 'twas muttered in hell,  
 And echo caught faintly the sound as it fell;  
 On the confines of earth 'twas permitted to rest,  
 And the depths of the ocean its presence confess'd;  
 'Twill be found in the sphere, when 'tis riven asunder;  
 'Tis seen in the lightning, and heard in the thunder:



'Twas allotted to man with his earliest breath,  
 It assists at his birth, and attends him in death;  
 Presides o'er his happiness, honour, and health;  
 Is the prop of his house, and the end of his wealth.  
 In the heap of the miser 'tis hoarded with care,  
 But is sure to be lost in his prodigal heir.  
 It begins every hope,—every wish it must bound;  
 It prays with the hermit, with monarchs is crowned.  
 Without it the soldier and seaman may roam,  
 But woe to the wretch that expels it from home.  
 In the whispers of conscience 'tis sure to be found,  
 Nor e'en in the whirlwind of passion is drown'd;  
 'Twill soften the heart,—though deaf to the ear,  
 'Twill make it acutely and instantly hear;  
 But in short let it rest; like a beautiful flower,  
 (Oh breathe on it softly,) it dies in an hour.

2. A word of one syllable, easy and short,  
 Which reads backwards and forwards the same;  
 It expresses the sentiments warm from the heart,  
 And to beauty lays principal claim.
3. A word there is, five syllables contains,  
 Take one away, no syllable remains.
4. Places of trust I oft obtain,  
 And protect the house from vermin;  
 I act as shepherd on the plain,  
 And at fairs I'm shown for learning:  
 In northern climes, a horse I'm seen,  
 And a roasting jack I too have been;  
 Strange as it seems, it's no less true,  
 That I eat on four legs, and beg on two.
5. Soon as I'm made I'm sought with care;  
 For one whole year consulted;  
 That time elapsed, I'm thrown aside,  
 Neglected, and insulted.
6. The beginning of eternity,  
 The end of time and space;  
 The beginning of every end,  
 And end of every place.
7. A man once launched a vessel large,  
 And live stock, too, he took in charge;  
 He did not barter, buy, nor sell:  
 Whichever wind blew, pleased as well;  
 He sailed at random, was to no port bound  
 His only wish was soon to run aground.

8. I'm slain to be saved, with much ado and pain,  
Scatter'd, dispersed, and gathered up again,  
Wither'd, though young; sweet, yet unperfumed,  
And carefully laid up to be consumed.

9. What pleases in the air, and what a horse does not like,  
gives the name of a flower.

10. Half a carman, and a whole country, will form the name  
of a beautiful flower.

11. What is the longest and yet the shortest thing in the  
world,—the swiftest, and yet the slowest,—the most divisible and  
the most extended,—the least valued and most regretted,—with-  
out which nothing can be done, — which devours every thing,  
however small, and yet gives life and spirits to every object,  
however great?

12. What is that we receive without being thankful for,—  
which we enjoy without knowing how we received it,— which  
we give away to others without knowing where it is to be found,  
—and which we lose without being conscious of our loss?

13. There is a thing was three weeks old,  
When Adam was no more;  
This thing it was but four weeks old,  
When Adam was fourscore.

14. I'm found in loss, but not in gain,  
If you search there, 'twill be in vain;  
I'm found in hour, but not in day:  
What I am, perhaps, you now can say.

#### CHARADES.

1. Ever eating, never cloying,  
All devouring, all destroying,  
Never finding full repast,  
'Till I eat the world at last.
2. My first is four-sixths of a step that is long,  
My second's a person of state;  
My whole is a thing that is known to be wrong,  
And is a strong symptom of hate.
3. Without my first you cannot stand,  
My second, beauteous fair command;  
Together I attend your will,  
And am your humble servant still.

4. My first gave us early support,  
My next is a virtuous lass;  
To the fields, if at eve you resort,  
My whole you will probably pass.
5. In every hedge my second is,  
As well as every tree;  
And when poor school-boys act amiss,  
It often is their fee.  
My first, likewise, is always wicked,  
Yet ne'er committed sin:  
My total for my first is fitted,  
Composed of brass or tin.
6. My first's a prop, my second's a prop, and my whole's a prop.
7. What a running stream does, and the first syllable of error,  
gives a production of nature.
8. My first, if you do, you won't hit;  
My next, if you do, you will have it;  
My whole, if you do, you won't guess it.
9. My whole is under my second and surrounds my first.
10. My first I hope you are, my second I see you are, and my whole I am sure you are.
11. My first is the cause of my second, and my whole is made sacred by God.

## CONUNDRUMS.

1. Why is an undutiful son like one born deaf?
2. Why are the pages of a book like the days of man?
3. Why is a king like a book?
4. Why is the leaf of a tree like the human body?
5. What is that which is lengthened by being cut at both ends?
6. When is small beer not small beer?
7. When is an alderman like a ghost?
8. What animal was in existence before the creation?
9. What is that which the dead and living do at the same time?
10. Where did the witch of Endor live?
11. How many sides are there to a tree?
12. What's that which every living man hath seen,  
But never more will see again, I ween?
13. Why was Noah in the ark like a disappointed rat-catcher?

14. Why are three couples going to church like a child's penny trumpet?

15. Why is your nose like St. Paul's?

16. When do your teeth usurp the functions of the tongue?

17. What street in London puts you in mind of a tooth which has pained you for a long time?

18. Why does an aching tooth impose silence on the sufferer?

19. To what town in Poland should you go to have it extracted?

20. Which of your teeth are like a dress-maker's fingers and thumb, when she is cutting out a dress?

21. Why is a pack of cards, of only fifty-one in the pack, sent home, like a pack of cards of fifty-two?

22. Which is the oldest tree in England?

23. Why is a man in debt like a misty morning?

24. Why are feet like olden tales?

25. Where was Adam going, when he was in his thirty-ninth year?

26. Why is an image on a pedestal like a hackney-coach when engaged?

27. Why are fish in a thriving state like fish made to imitate them?

28. Tom went out, his dog with him; he went not before, behind, nor on one side of him, then where did he go?

29. What question is that to which you must answer yes?

30. Why does a miller wear a white hat?

31. In what respect does a bad governess differ from a good one?

32. Why are lovers' sighs like long stockings?

33. Why is a nail fast in the wall like an old man?

34. Why is a man standing on a fishmonger's shop like a busy meddling fellow?

35. What is the most difficult thing in the world?

36. Why are some great men like glow-worms?

37. When is a door not a door?

38. Why is an orange like a church steeple?

39. What word is that, to which if you add a syllable, it will make it shorter?

40. Why is life like a publican's door-post?

41. What letters of the alphabet are likely to come too late for dinner, supping the whole to be invited?

42. Why are two men fighting a duel like a garden railing?

43. Why is swearing like an old coat?

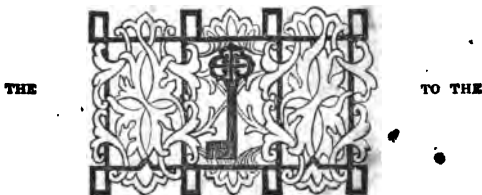
44. What is that which a coach cannot move without, and yet is not of the least use to it?

45. Why are fixed stars like pens, ink, and paper?

46. Why is a jest like a fowl?

47. Why is the sun like a man of fashion?
48. What do we all do when we first get into bed?
49. When is a nose not a nose?
50. What thing is that that is lower with ~~the~~ head, than with out one?
51. Why is a cobbler like a king?
52. Why is a cherry like a book?
53. Who was the first that bore arms?
54. What river is that which runs between ~~the~~ seas?
55. When is the river Thames good for the eyes?
56. What place should a glutton be sent to?
57. Why is a watchman like a mill-horse?
58. What wig cannot a barber make?
59. Why is an inn like a burial ground?
60. When is a sailor not a sailor?
61. Of what trade is the sun?
62. Where should a starving man be sent to?
63. Who was the first whistler?
64. What tune did he whistle?
65. Why are real friends like ghosts?
66. Why is Satan like a poker?
67. When is a man not a man?
68. What bird is a pedlar like?
69. When is a sailor like a corpse?
70. Make V less by adding to it.
71. Why is a widow like a gardener?
72. Why is a hired landau not a landau?
73. Why is a tight boot like an oak tree?
74. What two letters of the alphabet make a philosopher?
75. Why are your nose and chin always at variance?
76. When you go to bed, why are your slippers like an unsuccessful man?
77. What is that which is sometimes with a head, sometimes without a head, sometimes with a tail, sometimes without a tail, and sometimes without either head or tail?
78. Why is the largest city in Ireland likely to be the largest place in the world?
79. Why is a bad ~~man~~ like a poor pencil?
80. Why is one who lives by cheating sharper than the sharpest?
81. How do you swallow a door?
82. Why is a fruit pie like old port?
83. What is sharper than a razor?
84. Why is a thump like a hat?
85. Why ought a fisherman to be very wealthy?
86. If a fender and fire-irons cost three pence, what will a ton of coals come to?

87. Why is a summer's day like a passionate man?
88. Why is a watchman like a mill-horse?
89. Why is a monument like a proud man?
90. Why is a key like an hospital?
91. Why is a drawn tooth like a thing forgot?
92. Why is a good man like a bright jewel?
93. Why is an apothecary like a woodcock?
94. Why is it better to have friends than to want them?
95. What is that which is often brought to table, often cut but never eaten?
96. Why is a jailor like a musician?
97. What is that which lives in winter, dies in summer, and grows with its root upwards?
98. In what place did the cock crow when all the world could hear him?
99. Why is the soul like a thing of no consequence?
100. If you throw a man out of a window, what does he fall against?



## ENIGMAS, RIDDLES, ETC.

### ENIGMAS.

- |                                                                                                                                                           |                                                                                                                                                      |                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. The letter H.</li> <li>2. The Eye</li> <li>3. Monosyllable</li> <li>4. A Dog</li> <li>5. An Almanack</li> </ol> | <ol style="list-style-type: none"> <li>6. Letter E.</li> <li>7. Noah in Ark</li> <li>8. Hay</li> <li>9. Lark-spur</li> <li>10. Car-nation</li> </ol> | <ol style="list-style-type: none"> <li>11. Time</li> <li>12. Life</li> <li>13. The Moon</li> <li>14. Letter O.</li> </ol> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|

### CHARADES.

- |                                                                                                                            |                                                                                                                                           |                                                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. Fire</li> <li>2. Stri-king</li> <li>3. Foot-man</li> <li>4. Milk-maid</li> </ol> | <ol style="list-style-type: none"> <li>5. Candle-stick</li> <li>6. Foot-stool</li> <li>7. Flow-er (flower)</li> <li>8. Mistake</li> </ol> | <ol style="list-style-type: none"> <li>9. Waist-coat</li> <li>10. Well-come (wel-come)</li> <li>11. Sun-day.</li> </ol> |
|----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|

### CONUNDRUMS.

- |                                                                                                                        |                                                                                                                  |
|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. Your voice is lost on him.</li> <li>2. Because they are all dead.</li> </ol> | <ol style="list-style-type: none"> <li>3. Because he has pages</li> <li>4. Because it has veins in it</li> </ol> |
|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|

5. A ditch
6. When it is a little tart
7. When he is a gobbling (goblin)
8. The great shay-hoss (chaos)
9. They go round with the world
10. At Endor
11. Two, the inside and outside
12. Yesterday
13. Because it was forty days before  
he saw ere-a-rat (Ararat)
14. Because they go too, too, too,  
(two and two and two)
15. Because it is flesh and blood
16. When they are *chattering*
17. Long-Acre
18. Because it makes him hold his  
jaw
19. Pul-tusk
20. In-cisors
21. Because they're sent in-complete
22. The *Elder-tree*
23. Because he is full of dues (dews)
24. Because they are leg-ends (le-  
gends)
25. In his fortieth
26. Because it is on a stand
27. Because they are hearty-fish all  
(artificial)
28. On the other side
29. What does y-e-s spell
30. To keep his head warm
31. One miss-guides, and the other  
guides miss
32. Because they are high hose,  
(heigh ho's!)
33. Because it is infirm
34. Because he is over a fish house  
(officious)
35. To find out the most difficult  
thing in the world
36. Because it must be dark when  
they shine
37. When it is a-jar
38. Because we have a peel from it
39. Short (short-er)
40. Because it is chequered
41. Those that come after T. (V. W. X. Y. Z.)
42. Because they're fencing
43. Because it is a bad habit
44. Noise
45. Because they are stationary,  
(stationery)
46. It contains a merry-thought
47. Because it turns night into day
48. Make an impression
49. When it is a little radish (reddish)
50. A pillow
51. Because his nose is above his chin
52. Because it is read (red)
53. Adam
54. The Thames, which flows be-  
tween Chelsea and Battersea
55. When it is eye-water (high-  
water)
56. Eat-on (Eaton)
57. Because he goes his rounds
58. An Ear-wig
59. Because the weary traveller  
there finds rest
60. When he is a-board
61. A Tanner
62. Hungary
63. The Wind
64. Over the hills and far away
65. They are often heard of, but  
seldom seen
66. Because he belongs to the fire-  
place
67. When he's a shaving
68. A Hawk
69. When he is in the shrouds
70. IV.
71. Because she tries to get rid of  
her weeds
72. Because it is a landau let
73. Because it produces a-corn  
(acorn)
74. Y. Z. (Wise head)
75. Because words are constantly  
passing between them
76. Because they are put-off till the  
next day
77. A wig
78. Because every year it is doub-  
ling (Dublin)
79. Because it has got no point
80. Because he is a sharper
81. Bolt it
82. Because it is crusted
83. Hunger
84. Because it is felt
85. Because his is all net profit
86. To ashes
87. Because it is hot
88. Because he goes his rounds
89. Because it is lofty
90. Because it has wards in it
91. Because it is out of the head
92. Because all his actions are bril-  
liant
93. Because he has a long bill
94. Because they are so hard to find
95. A pack of cards
96. Because he fingers the keys
97. An icicle
98. In Noah's ark
99. It is immaterial
100. His inclination

## GEOGRAPHICAL PLAY.

LET each person of a party write on a piece of paper the name of some town, country, or province : shuffle these tickets together in a little basket, and whoever draws out one is obliged to give an account of some production, either natural or manufactured; for which that place is remarkable. This game brings out a number of curious bits of information which the party may have gleaned in reading or in travelling, and which they might never have mentioned to each other, but from some such motive.

Let us suppose there to be drawn Nuremberg, Turkey, and Iceland, of which the drawers narrate thus :—

*Nuremberg* has given to the world many useful inventions. Here were first made the pocket-watch, the air-gun, gun-lock, and various mathematical and musical instruments ; and at present half the children of Europe are indebted to Nuremberg for toys ; and the industry of the inhabitants is extended to teaching birds to pipe.

*Turkey* is celebrated for its costly carpets, which all the efforts of European art and capital have failed in closely imitating ; yet these carpets are woven by the women among the wandering tribes of Asiatic Turkey. The turkey bird is, however, very absurdly named, since it conveys the false idea that the turkey originated in Asia, whereas it is a native of America. Neither is "Turkey Coffee" grown in Turkey, but is so named from the great consumption of coffee in that country.

*Iceland* produces in abundance a certain lichen called Iceland Moss, which is brought to England as a medicine, but is in its native country used in immense quantities as an article of common food. When the bitter quality has been extracted by steeping in water, the moss is dried and reduced to powder, and then made into a cake with meal, or boiled and eaten with milk.

## STORY-PLAY.

You are to whisper a *word*, which must be a substantive, to the person who begins the play, and who is to tell a short story or anecdote, into which the word is to be frequently introduced. It requires some ingenuity to relate the story in so natural a manner, that the word shall not be too evident, and yet it may be sufficiently marked. When the story is finished, each of the party endeavours to guess the word ; and the person who discovers it tells the next story. The following is a specimen :—

"Three young children were coming down the Mississippi with their father in a sort of boat, which they call there a pirogue. They landed on a desert island in that wide river on a bitter snowy evening, in the month of December ; their father left them



on the island, promising to return after he had procured some brandy at a house on the opposite bank. He pushed off in his little boat, to cross the river; but the wind was high, and the water rough. The children watched him with tears in their eyes, struggling in his pirogue against the stream, till about half way across, when they saw the boat sink, and never more saw their father. Poor children! they were left alone, exposed to the storm, without fire, shelter, or even food, except a little corn.

"As the night came on, the snow fell faster; and the eldest, who was a girl only six years old, but very sensible and steady for her age, made her little sister and her infant brother creep close to her, and she drew their bare feet under her clothes. She had collected a few withered leaves and branches to cover them, and in this manner they passed the long winter's night. Next morning, she tried to support her poor weeping companions by giving them corn to chew; and sometimes she made them run about with her, to keep themselves warm.

"In this melancholy state, you may imagine what was her joy when, in the course of the day, she discovered a boat approaching the island. It happily contained some good-natured Indians, who took compassion on the children, shared their food with them, and safely conveyed them to New Madrid in their own boat."

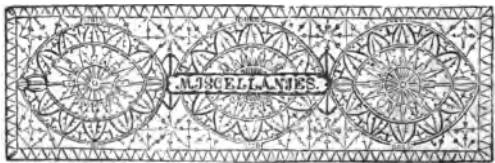
#### CAPPING VERSES.

LET us suppose a party seated around the parlour-fire, and each person to repeat as much of a poem as will complete the sense; the successive quotations all alluding to one general subject, or, at least, to something touched upon by the previous speaker. The following is a sample, in which eight persons join:

- A. Heap on more coals, the wind is chill;  
But let it whistle as it will,  
We'll keep our merry Christmas still.
- B. Still linger in our northern clime  
Some remnants of the good old time;  
And still, within our valleys here,  
We hold the kindred title dear.
- C. Decrepit now, December moves along  
The planky plains.
- D. Phoebus arise,  
And paint the sable skies  
With azure, white and red;  
Rouse Memnon's mother from her Tithon's bed,  
That she with roses thy career may spread.

- E.** Sad wears the hour, heavy and drear,  
Creeps, with slow pace, the warning year;  
And sullen, sullen heaves the blast  
Its deep sighs o'er the lonely waste.
- F.** Who loves not more the night of June,  
Than dull December's gloomy noon?  
The moonlight than the fog of frost?  
And can we say which cheats the most?
- G.** Mustering his storms, a sordid host,  
Lo! Winter desolates the rear.
- H.** Yet gentle hours advance their wing,  
And Fancy, mocking Winter's night,  
With flowers, and dews, and streaming light,  
Already decks the new-born spring.





#### TO POLISH SHELLS.

**MANY** species of marine and fresh water shells are composed of mother-of-pearl, covered with a strong epidermis. When it is wished to exhibit the internal structure of the shells, this epidermis is removed, and the outer testaceous coatings polished down, until the pearly structure becomes visible. It has been a common practice to remove the thick epidermis of shells by means of strong acids, but this is a very hazardous and tedious mode of operation. The best plan is to put the shells into a pan of cold water, with a quantity of quick-lime, and boil them from two to four hours, according to the thickness of the epidermis. The shells should be afterwards gradually cooled, and then some diluted muriatic acid applied carefully to the epidermis, which it will dislodge so that it may be easily peeled off. Two hours are quite sufficient for such shells as the common muscle to boil. After this, they must be polished with rotten-stone and oil, put on a piece of chamois leather, and then rubbed with a flannel or nail-brush.

The epidermis of the *Unio Margaritifera* is so thick that it requires from four to five hours boiling; underneath this epidermis, there is a thick layer of dull calcareous matter, which must be started off with a knife, or other sharp instrument; this requires great labour, but, when accomplished, a beautiful mother-of-pearl specimen is obtained, which makes an agreeable variety. Various *Turbos* and *Trochus's* are also deprived of their epidermis, and polished with files, sand-paper, and pumice-stone, till the pearly appearance is obtained. After the operation of polishing and washing with acids, a little Florence oil should be rubbed over, to bring out the colours, and destroy the influence of the acid, should any remain on the shell; it also tends to preserve the shells from decay. The muriatic acid should be applied to the epidermis by means of a feather: it should not be suffered to remain on the outside of the shell for more than a minute or two, and the greatest care should be used to keep the acid from touching, and consequently destroying the enamelled surface of the

inside; indeed, some persons coat the parts of the shell which they wish to preserve from the effects of the acid, with bees'-wax. Some conchologists prefer laying white of egg on the shell with a small camel's-hair brush, to rubbing them with Florence oil.

#### NOISE IN SHELLS.

HOLD the mouth of a sea-shell to the ear, and a singular resonance will be heard from within, which has been fancifully said to resemble the noise of the distant ocean: this effect being caused by the hollow form of the shell and its polished surface enabling it to receive and return the beatings of all sounds that chance to be trembling in the air around the shell.

#### HOW TO GROW AN OAK IN A HYACINTH-GLASS.

TAKE an acorn in November or December, and tie a string round it, so that when it is suspended, the blunt end of the acorn, where the cup was, is upwards. Hang it thus prepared, in the middle of a bottle, or hyacinth-glass, containing a little water, taking care that the acorn does not reach within an inch of the water; then wrap up the bottle in flannel, and put it in a warm place. In three or four weeks, the acorn will have swollen, its coat will have burst, and a little white point will make its appearance at the end opposite the water. This point is the root, for the acorn is becoming an oak: it must, however, still be kept in the dark, and clear of the water, till the young root is, at least, half an inch long. The water may then be allowed to rise higher; but it is only when from the neck of the root a little point begins to turn upward, that it is safe to allow the water to touch it; this point being, in fact, the beginning of a trunk, which, a century later, may form the timber of a frigate. As soon as this young stem begins to shoot, the oak will require a dose of light, a little every day; and it also yearns for more food, so that its root, which is in reality its mouth, must be allowed to touch the water, and to drink it. The little creature must then have air; it digests, and must have light; it sucks greedily, and must have fresh water given to its root, which, however, should be never wholly covered; just that point where the stem begins being always kept out of the water. The pet may now be set in a window. At first, it will be a stout thread, whitish, and covered with tiny scales,—then the scales will expand a little, and the end become greener. Next will appear some little leaves; hair will begin to grow, veins will branch; the old scales will fall off, and the leaves will slowly arrange themselves upon the stem, each unfolding from the bosom of the other. And thus, out of a little starch and gum, for the acorn was not much more, manifold parts will be curiously produced by the wondrous creative powers of nature.

## GLASS FROM STRAW.

WHEAT-straw, without any addition, may be melted into a colourless glass, with the blow-pipe. Barley-straw melts into a glass of a bright yellow colour.

## TO EXTRACT THE PERFUME OF FLOWERS.

PROCURE a quantity of the petals of any flower which has an agreeable perfume; card or comb thin layers of cotton wool, dip them into the best Florence oil, sprinkle a small quantity of fine salt on the flowers, and place layers of cotton and flowers alternately, in an earthen, or else a wide-mouthed glass vessel, until it is full. Then tie the top closely with a bladder, and place the vessel in a south aspect, exposed to the heat of the sun; and in about fifteen days, when opened, a fragrant oil may be squeezed from the whole mass, little inferior, if roses be chosen, to the dear and highly-prized otto or attar of roses.

## VEGETABLE SKELETONS.

PROCURE a large earthen open-topped pan, which will hold about a gallon, and put into it some leaves, seed vessels, &c., of plants; pour over them just so much boiling water as will cover them, and then place the pan upon the tiles of the house, or any other place, exposed to the rays of the sun, or the changes of the weather. Occasionally and carefully stir the leaves, but never change the water. The putrefaction and fermentation will soon ensue, and in about six weeks, or rather more, most of the specimens will be completely macerated, and require no further care than merely to hold them singly under the tap of a water-butt, or a little stream of water poured from a jug, to wash away all the putrid green pulpy matter. If this matter will not come off easily, when slightly assisted by the thumb and finger, or a small knife, the leaves must be soaked for some short time longer. Such of the leaves as are brittle and liable to break during the rinsing, may be preserved from fracturing by placing them upon a piece of board, and holding them up by the thumb and finger, while the water is running upon them; and if some of the green matter still remain between the veins of the skeleton-leaf, it may speedily be removed by striking the leaf perpendicularly and carefully with a clothes brush. The maceration and cleansing being finished, the leaves will next require bleaching, which may be done very effectually, by putting them in a band-box, with a small quantity of sulphur burning in a little gallipot by the side of them. The most certain method, however, of bleaching objects of this description, is to immerse them in dilute chloride of lime, or chloride of soda, for a few minutes. Amongst the most suitable subjects for this interesting

pursuit, will be found the leaves of the white and black Lombardy poplars; the lime and tulip trees, apricot, apple, orange, lemon, box, ivy, holly, and several of the exotic passion flowers, *Magnolia glauca*, *acuminata*, and others. The calyces of the *Molucalla laevis* are, when prepared, exceedingly pretty; as are also the calyces and seed vessels of the blue-flowered micandra, of the winter cherry, of henbane; the various kinds of campanulas, particularly the Canterbury bell, the hare-bell, and the throatwort; the larger species of mallows, the tree mallow, horehound, field and Alpine eryngoes, sea-holly, moon-trefoil, yellow lucern, common hedge nettle, several of the nettles, red hemp nettle, white fraxinella, Jerusalem sage, common thorn apple, atropa; the scutillarias or scull caps; and the capsules of all species of poppies. To these may be added the stalks of the cabbage, radish, flax, hemp, and stinging-nettles; the tuber of the turnip, the involucre of *Astrantia major* and *austriaca*, and of the *Hydrangea hortensis*. The above is a tolerably comprehensive list of those plants, the leaves and calyces of which may be reduced to skeletons with the greatest certainty; the leaves of the oak contain so much tannin that it is impossible to decompose them; as is the case also with the leaves of the walnut, hazel, hornbeam, chestnut, maple, elm, willow, sycamore, buckthorn, and tea-trees; care should, therefore, be taken that no leaves of the above-named trees be put in the vessel in which the process of maceration is going on, as they evolve their tanning qualities to such a degree as to hinder the decomposition of all the others in contact with them. It is also impossible to obtain skeletons of the leaves of the fir and camphor trees, and of the laurel, bay, and many other species of evergreens and shrubs, from their highly resinous properties.

#### CASTS OF LEAVES OF PLANTS.

ACCURATE casts of leaves of plants may be prepared by a very simple process. A quantity of fine grained sand, in rather a moist state, must be provided, on the surface of which a leaf selected for casting from should be laid, in the most natural position the taste of the artist can effect, by banking up the sand beneath its more elevated parts by the lateral pressure of the blade of a knife; when thus the leaf has been supported in every part, its surface should, by means of a broad camel-hair pencil, be covered over by a thin coating of wax and burgundy pitch rendered fluid by heat; the leaf being now removed from the sand and dipped into cold water, the wax becomes hard, and at the same time sufficiently tough to allow the leaf being ripped off from the wax mould, without altering the form of the latter. The wax mould is now placed on the sand, and banked up in

every part, as the leaf at first was; and then an edge or border being raised of sand around the mould, at a sufficient distance, very thin plaster of Paris is to be poured over it, and a camel-hair pencil used to brush the fluid plaster into every hollow on the surface, and exclude air-bubbles. As soon as the plaster is set, it will be found on taking it up from the sand, that the heat generated during the setting of the plaster will have softened the wax, and that the same may be dexterously rolled up from the impression thereof on the plaster: and thus the most beautiful and perfect moulds may be obtained for making any number of plaster casts, in relievo, of the leaf which has been selected.

#### CHERRY-STONE BASKETS.



MANY lads are extremely partial to the occupation of turning cherry-stones into pretty little baskets: that we may assist them as far as we can, we subjoin a few designs for their imitation; and for the instruc-

tion of those lads who have not attempted such miniature works of skill, we offer a few hints as to the mode of proceeding. A smooth round cherry-stone should be selected, and after planning out the size of the handle and depth of the basket, the superfluous portion of the stone should be filed away with a triangular file, till the handle stands all proper, as in our representations; the marks of the file, and all inequalities, should then be obliterated by scouring the stone with a bit of sand-paper till it is perfectly smooth and neat. The ornaments on the basket should be carved with a pen-knife, and, where practicable, the file may be brought into requisition; but especial pains must be taken that the lines decorating the sides run parallel with each other, and, if curved, that they sweep gracefully round the basket.

#### ROSIN GAS.

DIP the end of a copper tube, or tobacco pipe stem, into melted rosin, at a temperature a little above that of boiling water; and having taken out the tube or stem, hold it nearly in a vertical position, and blow through it, when bubbles will be formed of all possible sizes, from that of a hen's egg to sizes which can hardly be discerned by the naked eye; and, from their silvery lustre and reflection of the different rays of light, they will have a very pleasing appearance. These bubbles generally assume the form of a string of beads, many of them being perfectly regular, and connected by a very fine fibre; but the production is never

twice alike. If expanded by hydrogen, they would, probably, occupy the upper part of a room.

#### GOLD INK

Is made by grinding upon a porphyry slab, with a muller, gold leaves along with white honey, till they be reduced to the finest possible division. The paste is then collected upon the edge of a knife or spatula, put into a large glass, and diffused through water. The gold, by gravity, soon falls to the bottom, while the honey dissolves in the water, which must be decanted off. The sediment is to be repeatedly washed till entirely freed from the honey. The powder, when dried, is very brilliant; and, when to be used as an ink, may be mixed up with a little gum water. After the writing becomes dry, it should be burnished with a "dog's tooth."

*Silver Ink* is prepared in a similar manner.

#### TO WRITE BLACK WITH WATER.

Soak a sheet of paper in a solution of sulphate of iron, or green copperas, dry it, and dust over it finely-powdered galls; then write upon the paper with a pen dipped in water, and, on drying, the characters will appear black. Similar papers may be prepared by using other solutions and powders: thus, blue may be prepared by soaking it in a solution of sulphate of iron, and dusting it with powdered ferrocyanate of potash.

#### PLATINUM LAMP.

Coil a piece of platinum wire round the wick of a spirit lamp, and having lighted the lamp, let it burn till the wire becomes red-hot, when, extinguish the wick; the wire will then communicate sufficient heat to the vapour from the spirit, to enable it to burn without flame; and this may be continued as long as the spirit in the lamp supplies vapour.

#### ODORIFEROUS LAMP.

Form the lamp with a platinum wick, as above, but substitute Eau de Cologne for common spirit of wine, and the fragrance diffused will resemble aromatic vinegar, during the whole time the lamp burns.

#### TO FORM FIGURES IN RELIEF ON AN EGG.

Design on an egg-shell some pretty figure or ornament, with melted tallow, or any fat oily substance; then immerse the egg in very strong vinegar, and let it remain there till the acid has



corroded that part of the shell which is not covered with the greasy matter; when taken out, those parts will remain in relief, exactly as you have drawn them.

#### COMPOUND FOR ORNAMENTAL MEDALLIONS.

Put into a crucible an ounce of copper, and an ounce of antimony; fuse them by a strong heat, and pour the alloy into a mould. The compound will be of a most beautiful violet colour, very hard, and admirably adapted for casting works of taste, such as medallions, seals, &c. &c.

#### STORM-GLASSES

FORETEL the changes of weather in a very pleasing and singular manner; they are thus made. Procure a bottle or tube about ten inches in length, and three-fourths of an inch in diameter; into it put two drachms of camphor, half a drachm of purified nitre, and half a drachm of muriate of ammonia, pulverised and dissolved in two ounces of proof spirit, and then cover its mouth with a piece of bladder perforated by a needle. If the weather promise to be fine, the liquid portion of the composition will be perfectly transparent, whilst the solid matter will settle at the lower part of the bottle. If there be a probability of rain, the liquid will remain clear, but the compound will rise gradually, and minute stars move about in the vessel. Twenty-four hours before a storm, or very high wind, the fluid will become thick, and appear to be in a state of fermentation; whilst the solid matter will rise, and remain floating on the surface somewhat in the form of a leaf. In winter, the composition rises rather higher than usual, especially during the prevalence of frosts or snows, and small stars keep constantly in motion. During the hot and serene weather of the summer months, the substance subsides close to the bottom of the glass; and during windy weather, the solid particles adhere to the bottom on the side opposite to that from whence the wind blows.

#### THE WEATHER-HOUSE.

Peace to the artist, whose ingenious thought  
Devised the Weather-house, that useful toy!  
Fearless of humid air and gathering rains,  
Forth steps the man, an emblem of myself;  
More delicate, his timorous mate retires.

COWPER.

This toy represents a house, constructed with two doors, within one of which is placed the figure of a man; within the other, that of a woman. These figures are fixed, each at the extreme end of a horizontal lever, moving upon a central vertical axis; a little on one side of which is attached a piece of catgut,

which contracts in length under the influence of moisture, and stretches when the air is dry. Accordingly, the figures are so arranged, that, in damp weather, the catgut, by its contraction, draws that end of the lever to which the lady is attached, into the house; while the other end, which bears the man, is protruded.

On a similar plan, the figure of a monk wearing a cowl is constructed. In dry weather, the cowl rests upon his back and shoulders; but, during rain, the cowl covers the head and face of the figure.

#### TO PLAY MUSICAL GLASSES.

MUSICAL Glasses, or the *Armonica*, from the Greek word for *harmony*, are a number of drinking-glasses, of different sizes, fixed near each other, and tuned by putting into them water, more or less, as each note requires; the tones being brought out by pressing the fingers round their brims.

Mr. Tomlinson, in his valuable *Student's Manual of Natural Philosophy*, observes: "A common idea prevails that Musical Glasses are very difficult to play. This is quite a mistake; for there is no instrument requiring so little skill and attention from the performer. A few hours' practice will enable any one to bring out the tones fully and clearly: and when this skill is attained, the choice and execution of melodies must be left to the taste of the performer, since no further directions can be given. Many suggestions have been made as to the best mode of exciting the vibrations of the glass; but it is doubtful whether any mode is so available and consistent with the object in view as the moistened finger. The learner will find it advantageous to employ water slightly impregnated with alum, with lemon-juice, or a few drops of muriatic acid; but, with a little tact and a little practice, pure water will do perfectly well. It may also be remarked, that the tone is best elicited when the little finger is employed; and this must be moved *from*, and not *towards*, the player. The glasses should likewise be frequently sponged, to remove any dust or grease from the edges; and, previously to performance, if the learner has ever found it difficult to bring out the tones, the hands should be washed in *warm* water, for the purpose of softening the skin of the fingers; which must be well dried, and then dipped in *cold* water, to produce the tone. A glass of cold water should be contained within the case, as near to the performer as possible. When the apparatus is set aside, the glasses should be protected with a cover from dust and injury."

#### CHAMPAGNE EXPERIMENT.

Pour sparkling Champagne into a bell-glass, until it be half-full; then strike the edge of the glass with a knife, and it will

emit only a disagreeable and puffy sound. This effect will continue while the wine is filled with bubbles of air, or as long as the effervescence lasts; but when it begins to subside, the sound becomes clearer and clearer, and the glass rings as usual when the air-bubbles have vanished. If you reproduce the effervescence by stirring the Champagne with a piece of bread, the glass will again cease to ring. The same experiment will succeed with other effervescing fluids, as soda water, &c.

#### • TO MAKE BREAD SEALS.

**TAKE** a piece of new bread, knead it thoroughly in your hands till it acquires an adhesive and paste-like quality, free from all crumbs and lumps, and then colour it with some water-colour, using only sufficient to produce the desired tint. Next, lightly oil the impression in sealing-wax, which is to be the model from which your seal is to be produced, either with a camel's hair pencil dipped in sweet oil, or with a little bit of oiled wadding. Press the bread very carefully into every part of the impression, shape the upper part of it into a pyramidal form, remove it immediately, and suffer it to dry gradually.

#### TO MAKE GUM SEALS.

**SLIGHTLY** oil an impression in sealing-wax from a seal, and pour a small quantity of tolerably thick gum-water over it, adding more as it dries. When nearly dry, the coating of gum may be lifted off with a penknife; and a pyramidal handle, made of bread, worked up as directed for bread seals, added to it.

#### NEW METHOD OF TAKING A FAC-SIMILE.

**PASTE** a piece of white paper on the inside bottom of a porcelain plate; write upon this paper with common ink, and before it is dry, sprinkle upon it very fine powder of gum-arabia, which will afford a slight relief. When the ink is dry, brush off the superfluous gum, and pour into the plate a melted compound of eight parts bismuth, seven of lead, and three of tin; which is fusible at the boiling temperature of water. Cool it rapidly, to prevent crystallization. A counter-impression of the writing is thus obtained; and by dissolving off the gum in tepid water, the plate presents characters, which viewed by a lens are very legible and beautiful. From this plate, by means of common printing ink, true fac-similes of the original writing may be produced. Writing already dry may be copied in the same way, by going over the letters with a pen dipped in a very weak solution of gum—then sprinkling it with the powder, and proceeding as before. The only requisite precaution in this metallo-graphic operation is, that the metallic

plate must be of an even thickness, and that the surface on which the characters are traced must be perfectly smooth.

#### TO ETCH ON GLASS.

**TAKE** a piece of clean plate-glass, coat it on one side with a mixture of hard oil varnish and bees'-wax, and when dry, trace any design upon it with a sharp-pointed tool, taking care that every stroke be carried clean through the wax to the surface of the glass, which may be seen by holding it up to the light; then put into a pewter-plate one part of powdered fluor spar, and two of sulphuric acid, and lay the engraving downwards on the plate, suspended over a gentle heat, so long as white fumes are abundantly disengaged from the mixture; the glass will be corroded by the action of the fluoric acid gas upon it, and on the removal of the wax by means of spirit of turpentine, a permanent etching will remain.

#### TO TAKE OFF IMPRESSIONS IN PLASTER OF PARIS OR SULPHUR.

**THE** plaster must be pulverised and sifted through a piece of very fine gauze. First rub over the medal or engraved stone very softly with oil, and having wiped it with cotton, surround the edge of it with a slip of thin lead; mix up the sifted plaster with water, stir it gently to prevent it throwing up air bubbles; then pour it over the medal, or whatever it may be, the impression of which is wanted, and suffer it to harden and dry; it is easily detached, and forms a mould strongly marked. The process by sulphur is the same. Before these are used as moulds for impressions, they must be oiled.

#### TO TAKE IMPRESSIONS FROM SEALS.

**WARM** the seal a little, rub the end of a wax candle over it, and then sprinkle it with a little Chinese vermillion. Melt the sealing-wax, taking care that it does not catch fire; suffer it to drop upon the paper, press the seal upon it, and if performed adroitly, a beautiful impression will be the result.

If you wish to produce various colours in the impression, the seal should be powdered with colour of one tint, and then impressed upon wax of another; for instance, if the surface of the seal be dusted with lamp-black, the impression will show a red device upon a black ground.

#### VARNISH FOR ORNAMENTAL PURPOSES.

**A BEAUTIFUL** varnish for ornamental purposes may be readily made by the following process. Reduce into powder a stick of superfine sealing-wax, and put it into a phial, together with half

a gill of spirit of wine; put it in a warm place to dissolve, which it will do in a few hours, and it will be ready for use. Should it be too thick, it may be reduced by the addition of more spirit of wine till it is of the proper consistency.

The phial should be carefully corked, when not in use, by which means the varnish may be preserved for some time. It should be applied as thin as possible, by a camel's-hair brush, and if three coats be given, the effect will be pleasing.



# INDEX.

|                                   |                                      |
|-----------------------------------|--------------------------------------|
| ANGLER.....PAGE 168—200           | ARITHMETIC (continued)—PAGE          |
| Baits..... 172                    | Country-woman and Eggs ... 309       |
| Barbel, the..... 177              | Difference between two Num-          |
| Bleak, the..... 177               | bers, to find ..... 306              |
| Bream, the..... 180               | Digital Numbers, arrangement 308     |
| Bull-head, or Miller's Thumb. 176 | Even or Odd Shillings ..... 310      |
| Carp, the..... 181                | Figure struck out, to tell.... 311   |
| Casting the Line..... 194         | Figures up to 100—505 in each        |
| Chub, the..... 180                | column ..... 313                     |
| Dace, the..... 179                | Forty-five, the Number ..... 314     |
| Eels..... 186                     | Horse-dealer's Bargain..... 312      |
| Fish, different kinds of..... 173 | Magic Squares ..... 308              |
| Floats..... 171                   | Make any Number divisible by         |
| Flies, Artificial..... 191        | Nine, &c. .... 307                   |
| Fly-Fishing, Artificial..... 190  | Natural Square..... 308              |
| Natural..... 188                  | Number 9 ..... 304                   |
| Grayling, the..... 177            | Numbers thought of, to tell... 310   |
| Ground-bait..... 175              | Two or more thought                  |
| Gudgeon, the..... 178             | of, to tell..... 311                 |
| Hints for Anglers..... 199        | Odd and Even Numbers..... 306        |
| Hooks..... 172                    | Profit and Loss ..... 314            |
| Jack, or Pike, the..... 183       | Philosopher's Pupils, the.... 314    |
| Laws relating to Angling... 198   | Square Yard to find in writing       |
| Lines..... 170                    | the changes of the Alphabet 313      |
| Loach, the, or Stone Loach.. 176  | Three Country-women and              |
| Minnow, the..... 176              | Eggs ..... 308                       |
| Monthly Guide for Bottom-         | Weights, to find the Least           |
| fishing..... 195                  | Number of ..... 312                  |
| Natural Fly-fishing..... 188      | BAGATELLE..... 303                   |
| Paste baits..... 174              | BALLS..... 25—34                     |
| Perch, the..... 182               | Ball Stock..... 27                   |
| Pope, or Ruffe, the..... 183      | Catch-Ball..... 31                   |
| Rivers of England celebrated      | Egg-hat..... 30                      |
| for Fish..... 197                 | Feeder..... 25                       |
| Rivers, Canals, and Ponds near    | Fives..... 29                        |
| London..... 196                   | Foot-ball..... 26                    |
| Roach, the..... 178               | Golf..... 31                         |
| Rods..... 169                     | Hand-ball..... 30                    |
| Stickleback, the..... 176         | Hockey..... 33                       |
| Tench, the..... 182               | Monday, Tuesday..... 31              |
| Trout, the..... 187               | Northern Spell..... 33               |
| Winches..... 171                  | Rounders..... 26                     |
| ARCHERY..... 123—133              | Stool-ball..... 28                   |
| Arrows, the..... 128              | Trap, Bat, and Ball..... 33          |
| Bows..... 125                     | BANTAM OR DWARF FOWLS. 269, 270      |
| Butts..... 130                    | CARD-BOARD, MODELLING IN, 413—429    |
| Clout-shooting..... 132           | Architectural Models..... 418        |
| Hints on Practice..... 133        | Baskets..... 415                     |
| Position..... 131                 | Colouring Prints..... 429            |
| Quiver, the..... 128              | Corals, Artificial, for grottoes 428 |
| Roving..... 132                   | Cutting the Board..... 414           |
| String, the..... 126              | Gigs, Carriages, &c. .... 423        |
| String the Bow, to..... 127       | Glue, Cements, &c. .... 414          |
| Target, the..... 129              | Implements..... 413                  |
| ARITHMETIC, AMUSEMENTS 304—317    | Mouth glue, and joining sheets       |
| Basket and Stones, the..... 307   | of Drawing-paper..... 426            |

| CARD-BOARD, &c. (continued)— PAGE                                         |          | CHEMISTRY (continued)— PAGE     |          |
|---------------------------------------------------------------------------|----------|---------------------------------|----------|
| Ornaments, &c. ....                                                       | 415      | Perpetual Motion .....          | 358      |
| Paper Paste .....                                                         | 428      | Phosphorus Lamp .....           | 361      |
| Papier-mâché .....                                                        | 428      | Report with Tobacco-pipe....    | 359      |
| Rice-glue, to make.....                                                   | 427      | Rupert's Drops .....            | 351      |
| CORK MODELS .....                                                         | 430—436  | Soap, Chemistry of .....        | 347      |
| CARDS, TRICKS WITH .....                                                  | 333—342  | Spectral Lamp, the .....        | 361      |
| Card discovered by the Touch<br>or Smell.....                             | 338      | Spur-fire .....                 | 360      |
| Card in the egg.....                                                      | 338      | Substitute for a Wax Taper..    | 361      |
| Changeable Cards, the .....                                               | 340      | Sugar, Chemistry of .....       | 348      |
| Four Kings and Four Knaves<br>to change into Blank Cards<br>and Aces..... | 337      | — converted into Charcoal ..... | 357      |
| Fifteen thousand Livres, the.                                             | 337      | Sympathetic Inks .....          | 344      |
| Guess the Card thought of ...                                             | 334      | Test Papers, to make .....      | 353      |
| History of Playing Cards ....                                             | 333      | Theatrical Incantations ....    | 369      |
| Knives and the Constable, the                                             | 336      | Water-proof Paper .....         | 363      |
| Odd Ten, the.....                                                         | 335      | CHESS.....                      | 286—302  |
| Queen going to dig for Dia-<br>monds .....                                | 336      | Bishop, the.....                | 290      |
| Several Cards, to guess.....                                              | 338      | Castling .....                  | 294      |
| Tell the Card thought of in a<br>Circle of Ten .....                      | 334      | Check .....                     | 294      |
| Tell the Number of Cards<br>thought of by the Weight ..                   | 335      | Check Perpetual.....            | 294      |
| CHEMISTRY, AMUSEMENTS IN, 343, 344                                        |          | Checkmate .....                 | 295      |
| Artificial Petrifications.....                                            | 358      | Chess-board and Chess-men ..    | 286      |
| Attraction and Decomposition                                              | 351      | Conclusion .....                | 292      |
| Bengal Light .....                                                        | 360      | Doubled Pawn.....               | 298      |
| Burning Circle, the .....                                                 | 362      | Drawn Game .....                | 296      |
| Candle Cracker .....                                                      | 349      | En Prise .....                  | 296      |
| Chameleon Flowers .....                                                   | 363      | En Passant .....                | 296      |
| Chemical Attraction.....                                                  | 346      | Fool's Mate .....               | 296      |
| Coal-gas, to prepare .....                                                | 356      | Gain the Exchange .....         | 296      |
| Coin in a Walnut-shell, to melt                                           | 357      | Gambit .....                    | 296      |
| Coloured Flames .....                                                     | 359      | Games for Practice .....        | 296      |
| Combustion .....                                                          | 346      | General Observations.....       | 290      |
| — in Oxygen Gas... ..                                                     | 356      | History of the Game.....        | 286      |
| Fires, Green, Purple, Red, and<br>Whitish-Blue .....                      | 359, 360 | Jadoue .....                    | 296      |
| Gas-Candle, the .....                                                     | 355      | King, the .....                 | 290      |
| Gas, from India Rubber.....                                               | 355      | Knight, the .....               | 291      |
| Gases, the .....                                                          | 348      | Laws of Chess.....              | 291      |
| — Experiments with ....                                                   | 355      | Minor Piece .....               | 294      |
| Heat, the cause of .....                                                  | 344      | Opening the Game .....          | 297      |
| — Experiments.....                                                        | 349      | Passed Pawn.....                | 296      |
| Heat passing through Glass ..                                             | 361      | Pawn, the.....                  | 291      |
| Illumine the Surface of Water                                             | 358      | Queen, the .....                | 290      |
| Imitative Diving Bell.....                                                | 355      | Queen a Pawn, &c.....           | 296      |
| Incombustible Paper .....                                                 | 363      | Rook, or Castle, the .....      | 290      |
| India Rubber, to spin.....                                                | 363      | Scholar's Mate .....            | 296      |
| Instantaneous Lights.....                                                 | 359      | Stalemate .....                 | 295      |
| Laughing Gas, to prepare....                                              | 356      | Technical Terms used .....      | 294      |
| Luminous writing in the Dark                                              | 358      | Value and moves of the Pieces   | 290      |
| Magic of Heat.....                                                        | 351      | CORK, MODELLING IN .....        | 430, 451 |
| Magical Spoon, the .....                                                  | 357      | CRICKET .....                   | 57—84    |
| Mechanical Action .....                                                   | 345      | Bats, Balls, and Wickets....    | 74       |
| Mimic Frost-work.....                                                     | 357      | Bowler, the .....               | 80       |
| Miniature Fireworks .....                                                 | 358      | Catching or Stopping .....      | 83       |
| Mixture, to set on Fire with<br>Water .....                               | 358      | Cover .....                     | 80       |
| Percussion Composition .....                                              | 359      | Double Wicket .....             | 78       |
|                                                                           |          | Laws for Double Wicket.....     | 83       |
|                                                                           |          | Leg .....                       | 83       |
|                                                                           |          | Laws for Single Wicket .....    | 78       |
|                                                                           |          | Long-field, off-side.....       | 82       |
|                                                                           |          | — On side.....                  | 82       |
|                                                                           |          | Long Slip .....                 | 82       |
|                                                                           |          | Long Stop .....                 | 81       |
|                                                                           |          | Middle Wicket .....             | 82       |

|                                               |             |                                             |
|-----------------------------------------------|-------------|---------------------------------------------|
| <b>CRICKET (continued)—</b>                   | <b>PAGE</b> | <b>FENCING .....PAGE 134—150</b>            |
| Point .....                                   | 82          | Advancing and Retreating... 137             |
| Short Slip.....                               | 81          | Appel, the..... 136                         |
| Single Wicket.....                            | 75          | Assault, the..... 147                       |
| Striker, or Batsman, the.....                 | 79          | Concluding Observations..... 150            |
| Wicket-keeper, the.....                       | 81          | Disarming..... 149                          |
| <b>CRYSTALLISATION, AMUSEMENTS</b>            |             | Feints..... 149                             |
| IN.....                                       | 365—370     | Foil, the..... 135                          |
| Alum Baskets.....                             | 367         | Guard, the..... 136                         |
| — Crystals.....                               | 366         | Hold the Foil..... 136                      |
| Arbor Dianæ, or Silver Tree .                 | 370         | Longe, the..... 137                         |
| Blue Vitriol Crystals.....                    | 368         | Parades..... 138                            |
| Common Salt.....                              | 369         | Quarte and Tierce, &c..... 145              |
| Glauber Salts.....                            | 369         | Straight Thrusts, &c..... 141               |
| Groups, beautiful, of Crystals                | 368         | Time Thrusts in Opposition.. 143            |
| Insects, Flowers, Mosses, &c.                 | 368         | — Out of Opposition 145                     |
| Large Crystals.....                           | 369         | <b>FIREWORKS, CHINESE, &amp;c.. 409—419</b> |
| Lead Tree.....                                | 370         | <b>GUINEA-PIG, the..... 292, 293</b>        |
| Metallic Crystallisation.....                 | 368         | <b>GYMNASTICS..... 85—97</b>                |
| Muriate of Lead.....                          | 369         | Balancing Bar, the..... 93                  |
| Snow Crystals.....                            | 366         | Climbing the Rope..... 90                   |
| Star-like Crystals.....                       | 368         | — Ladder... 91                              |
| Sugar Candy.....                              | 367         | — Upright Poles &c. 90                      |
| <b>DEAF AND DUMB ALPHABET 440—444</b>         |             | — Wooden Ladder. 90                         |
| Letters.....                                  | 440         | Climbing Trees..... 97                      |
| Mora, or Miciare.....                         | 444         | Deep Leap, the..... 90                      |
| Numbers.....                                  | 444         | — with the Pole. 95                         |
| <b>DOMINOES..... 284, 285</b>                 |             | Flying Steps, or Giant Strides 96           |
| <b>DORMOUSE, the..... 218, 219</b>            |             | General Directions..... 86                  |
| <b>DRAUGHTS..... 275, 283</b>                 |             | High Leap, the..... 89                      |
| Concluding Observations.....                  | 283         | — with the Pole..... 95                     |
| Game described.....                           | 275         | Horizontal Bar, the..... 93                 |
| Games for Practice.....                       | 281         | Inclined Board, the..... 91                 |
| Laws of the Game.....                         | 279         | Long Leap, the..... 88                      |
| <b>ELECTRICITY, GALVANISM, AND MAG-</b>       |             | — with the Pole..... 95                     |
| <b>NETISM, AMUSEMENTS IN 395—404</b>          |             | Parallel Bars, the..... 92                  |
| Conclusion.....                               | 404         | Running..... 87                             |
| Electrical Shock from Paper .                 | 399         | Throwing the Javelin..... 97                |
| Electricity, Nature of.....                   | 395         | Vaulting..... 86                            |
| Electrotype Apparatus.....                    | 399         | Walking..... 87                             |
| Experiments in Electricity... 397             |             | — on Stilts..... 96                         |
| — Galvanism .. 400                            |             | <b>IN-DOOR SPORTS..... 41—55</b>            |
| — Magnetism .. 401                            |             | Blindman's Buff..... 41                     |
| Galvanism, Nature of.....                     | 396         | Breast to Mouth..... 48                     |
| Light under Water.....                        | 400         | Buff with the Wand..... 42                  |
| Magnetic Angling.....                         | 400         | Catch Penny..... 44                         |
| — Swan.....                                   | 400         | Chair from under you, to take,              |
| Magnets, directive power of.. 403             |             | without falling..... 46                     |
| Magnetism, Nature of.....                     | 397         | Chairing the Leg..... 46                    |
| Magnetic Agency by Balance. 403               |             | Dibs..... 54                                |
| Obedient Watch, the.....                      | 403         | Dot and carry Two..... 45                   |
| Poles attractive power of... 403              |             | Dumb Motions..... 54                        |
| Repulsion of the Poles, to show 403           |             | Easier to carry Two Weights                 |
| <b>ENIGMAS, RIDDLES, &amp;c. .... 445—455</b> |             | than One..... 48                            |
| Capping Verses.....                           | 454         | Finger Feat, the..... 47                    |
| Charades.....                                 | 447         | Fingers, Game of..... 54                    |
| Conundrums.....                               | 448         | Flying Book, the..... 47                    |
| Enigmas.....                                  | 445         | Forfeits, Penances for..... 51              |
| Geographical Play.....                        | 453         | Game of the Key..... 49                     |
| Key to.....                                   | 451         | Hunt the Slipper..... 43                    |
| Story Play.....                               | 453         | Hunt the Whistle..... 43                    |



| IN-DOOR SPORTS (continued)—      |                         | PAGE                             |                             | LEGERDEMAIN (continued)—       |                             | PAGE |  |
|----------------------------------|-------------------------|----------------------------------|-----------------------------|--------------------------------|-----------------------------|------|--|
| Huntsman, the .....              | 48                      | Wager, the Advantageous ...      | 326                         | Water in a Sling .....         | 317                         |      |  |
| Jingling .....                   | 42                      | Whisper, Loud .....              | 325                         | Wine & Water changing places   | 328                         |      |  |
| Jumping through your Fingers     | 45                      |                                  |                             | MARBLING .....                 | 35—40                       |      |  |
| Knuckle down .....               | 45                      | Bost-about .....                 | 38                          | Bounce-eye .....               | 39                          |      |  |
| Leap before you Look .....       | 47                      | Conqueror, the .....             | 39                          | Conqueror, the .....           | 39                          |      |  |
| Long Reach, the .....            | 46                      | Die and Cheese .....             | 38                          | Eggs in the Bush .....         | 40                          |      |  |
| Palm Spring, the .....           | 47                      | Increase Pound .....             | 36                          | Lag-out, or Knock-out .....    | 36                          |      |  |
| Penances for Forfeits .....      | 51                      | Nine-holes, or Arch-board...     | 36                          | Odd or Even .....              | 40                          |      |  |
| Puss in the Corner .....         | 43                      | Picking the Plums .....          | 40                          | Pyramid, or Castle, the .....  | 37                          |      |  |
| Prostrate and Perpendicular .    | 44                      | Ring-taw .....                   | 36                          | Slops and Spans .....          | 37                          |      |  |
| Schimmell, or Bell & Hammer      | 53                      | Three-holes .....                | 37                          | MISCELLANIES .....             | 456—466                     |      |  |
| Shadow Buff .....                | 42                      | Black, to write with Water ..    | 461                         | Bread Seals, to make .....     | 464                         |      |  |
| Snap-Apple .....                 | 55                      | Casts of Leaves of Plants ...    | 459                         | Champagne Experiments ...      | 463                         |      |  |
| Snap-Dragon .....                | 55                      | Cherry-stone Baskets .....       | 465                         | Compound for Medallions ...    | 468                         |      |  |
| Stooping Stretch, the .....      | 44                      | Etching on Glass .....           | 465                         | Fac-simile, new method of      | taking .....                | 464  |  |
| Tantalus Trick .....             | 44                      | Figures, to form on an Egg ..    | 461                         | Glass from Straw .....         | 458                         |      |  |
| Another .....                    | 45                      | Gold and Silver Inks, to prepare | 461                         | Gum Seals, to make .....       | 464                         |      |  |
| Thread the Needle .....          | 43                      | How to grow an Oak in a Hy-      | acinth-glass .....          | 457                            |                             |      |  |
| Thumb Spring .....               | 44                      | Impressions in Plaster, &c. ..   | 465                         | Impression from Seals, to take | 565                         |      |  |
| Triumph, the .....               | 43                      | Musical Glasses, to play .....   | 463                         | Noise in Shells .....          | 467                         |      |  |
| Tumble-down Dick .....           | 48                      | Odoriferous Lamp .....           | 461                         | Perfume of Flowers, to extract | 468                         |      |  |
| Turn-over, the .....             | 47                      | Platinum Lamp .....              | 461                         | Rosin Gas, to make .....       | 460                         |      |  |
| Two Hats, the .....              | 50                      | Shells, to Polish .....          | 464                         | Storm Glasses, to make .....   | 462                         |      |  |
| LEGERDEMAIN .....                | 315—332                 | Varnish, Ornamental .....        | 465                         | Vegetable Skeletons .....      | 468                         |      |  |
| Apple, the Miraculous .....      | 329                     | Weather-house, the .....         | 462                         | OPTICAL AMUSEMENTS .....       | 371—384                     |      |  |
| Balancer, the Little .....       | 317                     | Artificial Rainbow .....         | 384                         | Camera Lucida, the .....       | 380                         |      |  |
| Bottle Conjurer, the .....       | 325                     | Camera Obscura, the .....        | 380                         | Chinese Shadows .....          | 382                         |      |  |
| Bottle Imps, the .....           | 320                     | Colour, Cause of .....           | 374                         | Colours produced by unequal    | action of Light on the Eyes | 378  |  |
| Bottle, to Lift with a Straw ..  | 325                     | Colours produced by unequal      | action of Light on the Eyes | 378                            |                             |      |  |
| Candle Ends, eatable .....       | 318                     | Cosmorama, the Show-glass ..     | 382                         | Hand-writing upon the wall .   | 384                         |      |  |
| Cards, Magical .....             | 319                     | Kaleidoscope the, to construct   | 391                         | Circles .....                  | 383                         |      |  |
| Catch, a Good One .....          | 321                     |                                  |                             |                                |                             |      |  |
| Circle, the Magic .....          | 328                     |                                  |                             |                                |                             |      |  |
| Egg, the Balanced .....          | 319                     |                                  |                             |                                |                             |      |  |
| Egg-box, the .....               | 323                     |                                  |                             |                                |                             |      |  |
| Egg, the Travelling .....        | 318                     |                                  |                             |                                |                             |      |  |
| Glass of Wine under the Hat ..   | 329                     |                                  |                             |                                |                             |      |  |
| Gloemen and Jugglers .....       | 316                     |                                  |                             |                                |                             |      |  |
| Globe Box, the .....             | 324                     |                                  |                             |                                |                             |      |  |
| Goblet of water, to turn .....   | 321                     |                                  |                             |                                |                             |      |  |
| History of ...                   | 315                     |                                  |                             |                                |                             |      |  |
| Juggler's Joke, the .....        | 323                     |                                  |                             |                                |                             |      |  |
| Lead, to Melt in paper .....     | 319                     |                                  |                             |                                |                             |      |  |
| Motion, New Perpetual Rotary     | 330                     |                                  |                             |                                |                             |      |  |
| Omelet cooked in a Hat .....     | 329                     |                                  |                             |                                |                             |      |  |
| Omelet, the Impossible .....     | 330                     |                                  |                             |                                |                             |      |  |
| Pail of Water, to support ...    | 320                     |                                  |                             |                                |                             |      |  |
| Pen, the Dancing .....           | 319                     |                                  |                             |                                |                             |      |  |
| Ring and Handkerchief, the ..    | 327                     |                                  |                             |                                |                             |      |  |
| Shilling, to make turn on the    | Point of a Needle ..... | 319                              |                             |                                |                             |      |  |
| Shilling, out of a Handkerchief, | to take .....           | 321                              |                             |                                |                             |      |  |
| Sixpence, the Animated .....     | 319                     |                                  |                             |                                |                             |      |  |
| Smoke Snake, the .....           | 326                     |                                  |                             |                                |                             |      |  |
| Stick, the Balanced .....        | 317                     |                                  |                             |                                |                             |      |  |
| Stick, on Glasses, to break ...  | 325                     |                                  |                             |                                |                             |      |  |
| Trouble-Wit .....                | 322                     |                                  |                             |                                |                             |      |  |
| Ventriloquism .....              | 330                     |                                  |                             |                                |                             |      |  |
| Wafers, the Mysterious .....     | 326                     |                                  |                             |                                |                             |      |  |

| MISCELLANIES (continued)—                     |          | PAGE | OUT-DOOR SPORTS (continued)                    |          | PAGE |
|-----------------------------------------------|----------|------|------------------------------------------------|----------|------|
| Light, Nature of.....                         | 371      |      | Tag or Touch .....                             | 58       |      |
| — Reflection of.....                          | 372      |      | Two to One.....                                | 67       |      |
| — Refraction of.....                          | 373, 375 |      | Walk! my Lady, walk!.....                      | 70       |      |
| — Solar .....                                 | 374      |      | Warning.....                                   | 63       |      |
| — Velocity of.....                            | 372      |      | Whoop.....                                     | 57       |      |
| — From Gilt Buttons .....                     | 394      |      | Pigeons .....                                  | 224—242  |      |
| MagicLan't'n-Phantasmagoria.....              | 385      |      | Barb, the.....                                 | 233      |      |
| Microscope, Portable.....                     | 384      |      | Capuchin, the .....                            | 235      |      |
| — Simple .....                                | 384      |      | Carrier, the .....                             | 232      |      |
| Multiplying Theatres.....                     | 381      |      | Common Pigeon.....                             | 226      |      |
| Myriamroscope, the .....                      | 392      |      | Conclusion .....                               | 243      |      |
| Optical Augmentation.....                     | 375      |      | Diseases .....                                 | 241      |      |
| — Deceptions .....                            | 377      |      | Dragoon .....                                  | 234      |      |
| — Game .....                                  | 385      |      | Dutch Cropper, the .....                       | 237      |      |
| — Inversion .....                             | 383      |      | English Pouter, or Horseman.....               | 237      |      |
| Phantasmagoria, the .....                     | 386      |      | Fan-Tail, the .....                            | 236      |      |
| Prism, to make.....                           | 379      |      | Frill-back, the .....                          | 238      |      |
| Prismatic Colours, the .....                  | 379      |      | Helmet, the .....                              | 237      |      |
| Rays of Light crossing .....                  | 393      |      | Horseman, the .....                            | 239      |      |
| Rings of Light in Crystal .....               | 394      |      | Jacobin, the .....                             | 234      |      |
| Screens for Magic Lanterns,<br>to paint ..... | 389      |      | Lace, the.....                                 | 237      |      |
| Sliders for do., to paint .....               | 386      |      | Laws relating to .....                         | 242      |      |
| Soap-bubble, Beauty of the ..                 | 394      |      | Mawmet, the.....                               | 233      |      |
| Stanhope-lens, the.....                       | 378      |      | Narrow-tailed Shaker.....                      | 226      |      |
| Stroboscope, the .....                        | 376      |      | Nun, the .....                                 | 236      |      |
| Thaumatrope, the .....                        | 375      |      | Owl, the .....                                 | 236      |      |
| Visible and Invisible .....                   | 394      |      | Parisian Pouter .....                          | 239      |      |
| Water Lenses .....                            | 375      |      | Pigeon-house, the .....                        | 240      |      |
| OUT-OF-DOOR SPORTS .....                      | 56—72    |      | Runts .....                                    | 231      |      |
| Baste the Bear .....                          | 59       |      | Ruff, the .....                                | 236      |      |
| Casting the Ball.....                         | 67       |      | Spot, the .....                                | 234      |      |
| Cross Touch.....                              | 58       |      | Stock-dove, or Wild Pigeon ..                  | 224      |      |
| Dropping the Handkerchief ..                  | 67       |      | Trumpeter, the .....                           | 235      |      |
| Drawing the Oven .....                        | 56       |      | Tumbler, the .....                             | 239      |      |
| Duck.....                                     | 61       |      | Turbit, the .....                              | 235      |      |
| Duck and Drake.....                           | 66       |      | Turtle-dove, the .....                         | 225      |      |
| Duck Stone .....                              | 60       |      | Uploper, the.....                              | 229      |      |
| Fly the Garter.....                           | 65       |      | PUZZLES AND PARADOXES ..                       | 432—439  |      |
| Follow my Leader.....                         | 70       |      | Bead.....                                      | 434      |      |
| French and English.....                       | 58       |      | Card and Wood .....                            | 432, 433 |      |
| Hide and Seek.....                            | 59       |      | Chinese .....                                  | 434      |      |
| Hopping Bases .....                           | 57       |      | Circassian .....                               | 436      |      |
| Hop, Step, and Jump .....                     | 67       |      | Horse-shoe .....                               | 433      |      |
| Hippas .....                                  | 70       |      | Key to the .....                               | 466      |      |
| Hop-Scotch .....                              | 56       |      | Maze or Labyrinth .....                        | 434      |      |
| Hunt the Hare .....                           | 58       |      | Mosaic .....                                   | 436      |      |
| I spy I.....                                  | 72       |      | Mysterious Circles, the .....                  | 436      |      |
| "Jack! Jack! Show a Light!" ..                | 71       |      | Two Sounds at once from the<br>same Mouth..... | 439      |      |
| King of the Castle.....                       | 66       |      | RABBITS .....                                  | 201—213  |      |
| Leap-Frog .....                               | 65       |      | Diseases .....                                 | 211      |      |
| Long Rope .....                               | 67       |      | Fancy Rabbits .....                            | 206      |      |
| Prisoner's Base.....                          | 62       |      | Laws relating to Rabbits ..                    | 212      |      |
| Pulley, the .....                             | 71       |      | Lops, various .....                            | 206      |      |
| Rushing Bases.....                            | 63       |      | Rabbit-hutches and Houses ..                   | 209      |      |
| Saddle my Nag .....                           | 61       |      | Tame Rabbit, the.....                          | 203      |      |
| See-saw .....                                 | 64       |      | Wild Rabbit, the .....                         | 203      |      |
| Sliding .....                                 | 71       |      | RIDING .....                                   | 151—167  |      |
| Snow and Ice Houses.....                      | 68       |      | Aids .....                                     | 155      |      |
| Snow Statue, the .....                        | 68       |      | Animations, Soothings, &c... ..                | 157      |      |
| Swing, the .....                              | 71       |      | Canter and Gallop, the .....                   | 163      |      |

| RIDING (continued)—           |         | PAGE | SWIMMING (continued)—          |          | PAGE |
|-------------------------------|---------|------|--------------------------------|----------|------|
| Concluding Observations ....  | 167     |      | Advantage of Swimming ....     | 99       |      |
| Correspondence, the .....     | 155     |      | Aids in Swimming .....         | 103      |      |
| Flying Leap, the .....        | 165     |      | Back Swimming .....            | 112      |      |
| Holding the Reins .....       | 154     |      | Beat the water, to .....       | 113      |      |
| Mounting .....                | 151     |      | Carry Left Leg in Right Hand   | 113      |      |
| Seat and Balance .....        | 153     |      | Cramp, the .....               | 105      |      |
| Standing Leap, the .....      | 164     |      | Diving .....                   | 107      |      |
| Stop, the .....               | 161     |      | Drowning, Causes of .....      | 115      |      |
| Trotting .....                | 162     |      | Entering Water, striking out.  | 106      |      |
| Vices .....                   | 158     |      | Floating .....                 | 112      |      |
| Walk, the .....               | 160     |      | Franklin's Hints to Swimmers   | 100      |      |
| <b>SILKWORKS</b> .....        | 271—274 |      | Plunging .....                 | 107      |      |
| <b>SKATING</b> .....          | 116—123 |      | Roll in the Water .....        | 114      |      |
| Back Roll, the .....          | 121     |      | Show both Feet out of Water    | 113      |      |
| Dutch Travelling Roll, the... | 119     |      | Side Swimming .....            | 111      |      |
| Figure of Eight, the .....    | 119     |      | Spin in the Water .....        | 114      |      |
| Three .....                   | 120     |      | Swim under Water .....         | 113      |      |
| Forward Roll, the .....       | 119     |      | Swim like a Dog .....          | 114      |      |
| Miscellaneous Hints .....     | 121     |      | Swimming in Deep Water ..      | 108      |      |
| Outside Edge Backwards .....  | 120     |      | Swimming Schools .....         | 114      |      |
| Skate, the .....              | 117     |      | Thrusting .....                | 111      |      |
| <b>SONG-BIRDS</b> .....       | 243—268 |      | Times & Places for Swimming    | 102      |      |
| Bird-catching .....           | 244     |      | Treading Water .....           | 110      |      |
| —lime .....                   | 247     |      | Upright Swimming .....         | 106      |      |
| Blackbird, the .....          | 259     |      | <b>TOYS</b> .....              | 9        |      |
| Blackcap, the .....           | 264     |      | Apple Mill, the .....          | 11       |      |
| Breeding-cage, the .....      | 266     |      | Balance Figures .....          | 90       |      |
| Bulfinch, the .....           | 251     |      | Bandilor, the .....            | 90       |      |
| Cages.—See the various Birds. |         |      | Battledore and Shuttlecock...  | 11       |      |
| Canary, the .....             | 253     |      | Boomerang, the .....           | 19       |      |
| Chaffinch, the .....          | 250     |      | Cat and Mouse .....            | 12       |      |
| Coviteness .....              | 268     |      | Cup and Ball, the .....        | 90       |      |
| Disorders of Tame Birds ..... | 266     |      | Hoop .....                     | 15       |      |
| German Paste, to make .....   | 268     |      | Jack-straws, or Jerk-straws..  | 13       |      |
| Goldfinch, the .....          | 252     |      | Kite .....                     | 9        |      |
| Horse-hair Nooses .....       | 245     |      | Pea-shooter .....              | 15       |      |
| Husk, or Asthma, the .....    | 266     |      | Pop-guns .....                 | 13       |      |
| Lice on Birds .....           | 268     |      | Quoits .....                   | 18       |      |
| Linnet, the .....             | 248     |      | Skip-Jack, or Jump-Jack .....  | 12       |      |
| Loss of Voice .....           | 268     |      | Sling .....                    | 18       |      |
| Moulting .....                | 268     |      | Spillikins .....               | 14       |      |
| Nightingale, the .....        | 261     |      | Sucker, the .....              | 19       |      |
| Nightingale Trap, the .....   | 247     |      | Tip Cat .....                  | 13       |      |
| Obstruction of the Rump-gland | 267     |      | Watch-spring Gun .....         | 17       |      |
| Overgrown Claws and Beaks.    | 268     |      | Whalebone Cross-bow .....      | 15       |      |
| Pip, the .....                | 267     |      | <b>TOYS</b> .....              | 22—24    |      |
| Redbreast, the .....          | 263     |      | Chip-stone .....               | 23       |      |
| Redpole, the lesser .....     | 249     |      | Humming-tops .....             | 24       |      |
| Redstart, the .....           | 265     |      | Peg in the Ring .....          | 22       |      |
| Sieve-trap .....              | 245     |      | Peg-tops .....                 | 22       |      |
| Skylark, the .....            | 256     |      | Spanish Peg-tops .....         | 23       |      |
| Song-thrush, the .....        | 258     |      | Whip-top .....                 | 24       |      |
| Springle .....                | 246     |      | <b>TOY BALLOONS</b> .....      | 405—408  |      |
| Starling, the .....           | 260     |      | Air and Fire Balloons, to con- |          |      |
| Surfeit, the .....            | 267     |      | struct .....                   | 406      |      |
| Sweating .....                | 267     |      | Air and Water Balloon .....    | 408      |      |
| Titlark, the .....            | 257     |      | Balloon described .....        | 405      |      |
| Woodlark, the .....           | 258     |      | India Rubber Balloons .....    | 406      |      |
| <b>SQUIRREL</b> , the .....   | 214—217 |      | Parachutes, to make .....      | 406      |      |
| <b>SWIMMING</b> .....         | 98—115  |      | <b>WHITE MICE</b> .....        | 290, 221 |      |

THE END.













Princeton University Library



32101 064794223

4206.205

ANNEX

The boy's treasury of  
sports, pastimes, and  
recreation

DATE

ISSUED TO

DATE ISSUED

DATE DUE

DATE ISSUED

DATE DUE

